19XL
50/60 Hz
Hermetic Centrifugal Liquid Chillers with HCFC–22 and HFC–134a

Installation Instructions

For Units Produced After 11/1/92 (Linear Float Design)

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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Safety Considerations

Centrifugal liquid chillers are designed to provide safe and reliable service when operated within design specifications. When operating this equipment, use good judgement and safety precautions to avoid damage to equipment and property or injury to personnel.

Be sure you understand and follow the procedures and safety precautions contained in the machine instructions, as well as those listed in this guide.

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DANGER **DANGER**

DO NOT VENT refrigerant relief devices within a building. Outlet from rupture disc or relief valve must be vented outdoors in accordance with the latest edition of ANSI/ASHRAE 15 (Safety Code for Mechanical Refrigeration). The accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation.

PROVIDE adequate ventilation in accordance with ANSI/ASHRAE 15, especially for enclosed and low overhead spaces. Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse can be fatal. Vapor is heavier than air and reduces the amount of oxygen available for breathing. Product causes eye and skin irritation. Decomposition products are hazardous.

DO NOT USE OXYGEN to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.

DO NOT USE air to leak test. Use only refrigerant or dry nitrogen.

NEVER EXCEED specified test pressures. VERIFY the allowable test pressure by checking the instruction literature and the design pressures on the equipment nameplate.

DO NOT VALVE OFF any safety device.

BE SURE that all pressure relief devices are properly installed and functioning before operating any machine.

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WARNING **WARNING**

DO NOT WELD OR FLAMECUT any refrigerant line or vessel until all refrigerant (*(liquid and vapor*) has been removed from chiller. Traces of vapor should be displaced with dry air or nitrogen and the work area should be well ventilated. *Refrigerant in contact with an open flame produces toxic gases*.

DO NOT USE eyebolts or eyebolt holes to rig machine sections or the entire assembly.

DO NOT work on high-voltage equipment unless you are a qualified electrician.

DO NOT WORK ON electrical components including control panels, switches, starters, or oil heater until you are sure ALL POWER IS OFF and no residual voltage can leak from capacitors or solid-state components.

LOCK OPEN AND TAG electrical circuits during servicing. IF WORK IS INTERRUPTED, confirm that all circuits are generalized before resuming work.

DO NOT siphon refrigerant.

AVOID SPILLING liquid refrigerant on skin or getting it into the eyes. USE SAFETY GOGGLES. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, IMMEDIATELY FLUSH EYES with water and consult a physician.

NEVER APPLY an open flame or live steam to a refrigerant cylinder. Dangerous over pressure can result. When it is necessary to heat refrigerant, use only warm (110 F [43 C]) water.

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WARNING **WARNING**

DO NOT REUSE disposable (nonreturnable) cylinders or attempt to refill them. It is DANGEROUS AND ILLEGAL. When cylinder is emptied, evacuate remaining gas pressure, loosen the collar, and unscrew and discard the valve stem. DO NOT INCINERATE.

CHECK THE REFRIGERANT TYPE before adding refrigerant to the machine. The introduction of the wrong refrigerant can cause machine damage or malfunction. Operation of this equipment with refrigerants other than those cited herein should comply with ANSI/ASHRAE-15 (latest edition). Contact Carrier for further information on use of this machine with other refrigerants.

DO NOT ATTEMPT TO REMOVE fittings, covers, etc., while machine is under pressure or while machine is running. Be sure pressure is at 0 psig (0 kPa) before breaking any refrigerant connection.

CAREFULLY INSPECT all relief valves, rupture discs, and other relief devices AT LEAST ONCE A YEAR. If machine operates in a corrosive atmosphere, inspect the devices at more frequent intervals.

DO NOT ATTEMPT TO REPAIR OR RECONDITION any relief valve when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism. Replace the valve.

DO NOT install relief devices in series or backwards.

USE CARE when working near or in line with a compressed spring. Sudden release of the spring can cause it and objects in its path to act as projectiles.

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CAUTION **CAUTION**

DO NOT STEP on refrigerant lines. Broken lines can whip about and release refrigerant, causing personal injury.

DO NOT climb over a machine. Use platform, catwalk, or staging. Follow safe practices when using ladders.

USE MECHANICAL EQUIPMENT (crane, hoist, etc.) to lift or move inspection covers or other heavy components. Even if components are light, use mechanical equipment when there is a risk of slipping or losing your balance.

BE AWARE that certain automatic start arrangements CAN ENGAGE THE STARTER, TOWER FAN, OR PUMPS. Open the disconnect ahead of the starter, tower fan, and pumps. Shut off the machine or pump before servicing equipment.

USE only repaired or replacement parts that meet the code requirements of the original equipment.

DO NOT VENT OR DRAIN waterboxes containing industrial brines, liquid, gases, or semisolids without the permission of your process control group.

DO NOT LOOSEN waterbox cover bolts until the waterbox has been completely drained.

DOUBLE-CHECK that coupling nut wrenches, dial indicators, or other items have been removed before rotating any shafts.

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CAUTION **CAUTION**

DO NOT LOOSEN a packing gland nut before checking that the nut has a positive thread engagement.

PERIODICALLY INSPECT all valves, fittings, and piping for corrosion, rust, leaks, or damage.

PROVIDE A DRAIN connection in the vent line near each pressure relief device to prevent a build-up of condensate or rain water.

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Introduction

General

The 19XL machine is factory assembled, wired, and leak tested. Installation (not by Carrier) consists primarily of establishing water and electrical services to the machine. The rigging, installation, field wiring, field piping and insulation of waterbox covers are the responsibility of the contractor and/or customer. Carrier has no installation responsibilities for the equipment.

Job Data

Necessary information consists of:

- job contract or specifications
- machine location prints
- rigging information
- piping prints and details
- field wiring drawings
- starter manufacturer's installation details
- Carrier certified print

Equipment Required

- mechanic's tools (refrigeration)
- volt-ohmmeter and clamp-on ammeter
- leak detector (halide or electronic)
- absolute pressure manometer or wet-bulb vacuum indicator
- portable vacuum pumps

Installation

Receiving the Machine

Inspect Shipment

CAUTION **CAUTION**

Do not open any valves or loosen any connections. The standard 19XL machine is shipped with a full refrigerant charge. Some machines may be shipped with a nitrogen holding charge as an option.

1. Inspect for shipping damage while machine is still on shipping conveyance. If machine appears to be damaged or has been torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. *Manufacturer is not responsible for any damage incurred in transit.*
2. Check all items against shipping list. Immediately notify the nearest Carrier representative if any item is missing.
3. To prevent loss or damage, leave all parts in original packages until beginning installation. All openings are closed with covers or plugs to prevent dirt and debris from entering machine components during shipping. A full operating oil charge is placed in the oil sump before shipment.

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Identify Machine

The machine model number, serial number, and heat exchanger sizes are stamped on machine identification nameplate (Figure 1, Figure 2 (Front View) (Rear View). Check this information against shipping papers and job data.

Click here for Figure 1 — Model Number Identification

Provide Machine Protection

Protect machine and starter from construction dirt and moisture. Keep protective shipping covers in place until machine is ready for installation. If machine is exposed to freezing temperatures after water circuits have been installed, open waterbox drains and remove all water from cooler and condenser. Leave drains open until system is filled.

Click here for Figure 2 (Front and Rear Views) — Typical 19XL Installation (300 to 600 Tons [1055 to 2110 kW])

Rigging the Machine

The 19XL machine can be rigged as an entire assembly. It also has flanged connections that allow the compressor, cooler, and condenser sections to be separated and rigged individually.

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Rig Machine Assembly

See rigging instructions on label attached to machine. Also refer to rigging guide Figure 3, physical data in Figure 4, and Table 1, Table 2, Table 3, Table 4, Table 5A and Table 5B. *Lift machine only from the 3 points indicated in rigging guide.* Each lifting cable or chain must be capable of supporting the entire weight of the machine.

WARNING **WARNING**

Lifting machine from points other than those specified may result in serious damage to the unit and personal injury. Rigging equipment and procedures must be adequate for machine weight. See Table 1, Table 2, Table 3, Table 4, Table 5A, and Table 5B for machine weights.

Note: These weights are broken down into component sections for use when installing the unit in sections. For the complete machine weight, add all component sections and refrigerant charge together. See Table 1, Table 2, Table 3, Table 4, Table 5A, and Table 5B for machine component weights.

IMPORTANT: Make sure that rigging cable is over the rigging bar before lifting.

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Rig Machine Components

Refer to instructions below, Figure 5, Figure 6, Figure 7, Figure 8, Figure 9, and Carrier Certified Prints for machine component disassembly.

IMPORTANT: Only a qualified service technician should perform this operation.

WARNING **WARNING**

Do not attempt to disconnect flanges while the machine is under pressure. Failure to relieve pressure can result in personal injury or damage to the unit.

CAUTION **CAUTION**

Before rigging the compressor, disconnect all wires entering the power panel.

Note: If the cooler and condenser vessels must be separated, the heat exchanger separation feet can be unbolted, slipped down, and re-bolted in order to keep each heat exchanger level. See Figure 3.

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Note: Wiring must also be disconnected. Label each wire before removal (see Carrier Certified Prints). In order to disconnect the starter from the machine, remove wiring for the oil pump, oil heater, control wiring at the power panel, and the main motor leads at the starter lugs.

Remove all transducer and sensor wires at the sensor. Clip all wire ties necessary to pull heat exchangers apart.

Click here for Figure 3 — Machine Rigging Guide

Click here for Figure 4 — 19XL Dimensions

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Click here for Table 4 — Additional Heat Exchanger Weight for Marine Waterboxes*

Click here for Table 5A — 19XL Waterbox Cover Weights* (English, lb.)

Click here for Table 5B — 19XL Waterbox Cover Weights* (SI, kg)

To Separate Cooler and Condenser

1. Turn vessel separation feet into lowered position (Figure 5, Item 1).
2. Disconnect the flared fitting on the refrigerant motor cooling line at the isolation valve (Figure 6, Item 3).
3. Disconnect the condenser discharge line at the compressor (Figure 6, Item 1).
4. Cut the hot gas bypass line on the cooler side of the isolation valve (not shown).
5. Cut cooler liquid feed line at location indicated (Figure 5, Item 2).
6. Cover all openings.
7. Disconnect the wires and cable housings which cross from the starter to the power panel at the power panel (Figure 7, Item 8).

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8. Disconnect the rabbet-fit connectors on the tube sheets (Figure 7, Item 7).
9. Rig vessels apart.

To Separate the Compressor from the Cooler

1. Unbolt suction elbow at the cooler flange (Figure 7, Item 11).
2. Disconnect the flared fitting on the refrigerant motor cooling line at the isolation valve (Figure 6, Item 3).
3. Cut the refrigerant return line from the oil cooler (Figure 6, Item 2).
4. Disconnect the motor refrigerant return line (Figure 8, Item 1).
5. Disconnect the following (Figure 7):
   a. Oil sump sensor cable (Item 5).
   b. Bearing sensor cable (Item 4).
   c. Motor sensor cable (Item 3).
   d. Wires and cable housing which cross to the starter and control panel from the power panel (Items 8 and 9).
   e. Discharge sensor cable (Item 6).
   f. Oil pressure transducer cable (Item 2).
   g. Guide vane actuator cable (Item 10).
6. Disconnect the flared fittings for the oil reclaim lines (Figure 9, Item 1).

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7. Unbolt the compressor discharge line (Figure 6, Item 1).
8. Cover all openings.
9. Disconnect motor power cables at the starter lugs (Figure 7, Item 1).
10. Rig compressor.

CAUTION **CAUTION**

Do not tilt the compressor; oil charge is still contained in the oil sump.

Click here for Figure 5 — 19XL Condenser Drain

Click here for Figure 6 — 19XL Motor End View

Click here for Figure 7 — 19XL Machine Top View

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Click here for Figure 8 — 19XL Refrigerant Return

Click here for Figure 9 — 19XL Oil Reclaim System

To Rig Compressor

Note: The motor end of the 19XL compressor is heavy and will tip backwards unless these directions are followed:

1. Remove rigging bar (Figure 6, Item 4) and the bolts securing it.
2. Place the rigging bar vertically over the compressor end bell (Figure 6, Item 5). Attach the rigging bar to the compressor end bell using the 2 bolts removed in Step 1.

Additional Notes

1. Use silicon grease on new O-rings when refitting.
2. Use gasket sealant on new gaskets when refitting.
3. Cooler and condenser vessels may be rigged vertically. Rigging should be fixed to all 4 corners of the tube sheet.

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Install Machine Supports

Install Standard Isolation

Figure 10 and Figure 11 show the position of support plates and shear flex pads, which together form the standard machine support system.

Install Accessory Isolation (if required)

Uneven floors or other considerations may dictate the use of accessory soleplates (supplied by Carrier for field installation) and leveling pads. Refer to Figure 10 and Figure 12.

Level machine by using jacking screws in isolation sole-plates. Use a level at least 24-in. (600 mm) long.

For adequate and long lasting machine support, proper grout selection and placement is essential. Carrier recommends that only premixed, epoxy type, non-shrinking grout be used for machine installation. Follow manufacturer's instructions in applying grout.

1. Check machine location prints for required grout thickness.
2. Carefully wax jacking screws for easy removal from grout.
3. Grout must extend above the base of the soleplate and there must be no voids in grout beneath the plates.
4. Allow grout to set and harden, per manufacturer's instructions, before starting machine.
5. Remove jacking screws from leveling pads after grout has hardened.

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Click here for Figure 10 — 19XL Machine Footprint

Click here for Figure 11 — Standard Isolation

Install Spring Isolation

Spring isolation may be purchased as an accessory from Carrier for field installation. It may also be field supplied and installed. Spring isolators may be placed directly under machine support plates or located under machine soleplates. See Figure 13. Consult job data for specific arrangement. Low profile spring isolation assemblies can be field supplied to keep the machine at a convenient working height (Figure 14).

Obtain specific details on spring mounting and machine weight distribution from job data. Also, check job data for methods to support and isolate pipes that are attached to spring isolated machines.

Click here for Figure 12 — Accessory Isolation

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Click here for Figure 13 — 19XL Accessory Spring Isolation (Shown with Accessory Soleplates)

Click here for Figure 14 — Typical 19XL Low Profile Isolation Assembly

Connect Piping

Install Water Piping to Heat Exchangers

Install piping using job data, piping drawings, and procedures outlined below. A typical piping installation is shown in Figure 15.

CAUTION **CAUTION**

Factory-supplied insulation is not flammable but can be damaged by welding sparks and open flame. Protect insulation with a wet canvas cover.

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CAUTION ⚠ **CAUTION**

Remove chilled and condenser water sensors before welding connecting piping to water nozzles. Refer to Figure 2. Replace sensors after welding is complete.

1. Offset pipe flanges to permit removal of waterbox cover for maintenance and to provide clearance for pipe cleaning. No flanges are necessary with marine waterbox option; however, water piping should not cross in front of the waterbox or access will be blocked.
2. Provide openings in water piping for required pressure gages and thermometers. For thorough mixing and temperature stabilization, wells in the leaving water pipe should extend inside pipe at least 2 in. (50 mm).
3. Install air vents at all high points in piping to remove air and prevent water hammer.
4. Install pipe hangers where needed. Make sure no weight or stress is placed on waterbox nozzles or flanges.
5. Water flow direction must be as specified in Figure 16.

Note: Entering water is always the lower of the 2 nozzles. Leaving water is always the upper nozzle for cooler or condenser.

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6. Water flow switches must be of vapor-tight construction and must be installed on top of pipe in a horizontal run and at least 5 pipe diameters from any bend.

7. Install waterbox vent and drain piping in accordance with individual job data. All connections are 3/4 -in. FPT.
8. Install waterbox drain plugs in the unused waterbox drains and vent openings.
9. Install optional pumpout system or pumpout system and storage tank as shown in Figure 17, Figure 18, Figure 19, and Figure 20.

Figure 15 — Typical Nozzle Piping

Figure 16 — Piping Flow Data

Figure 17 — Optional Pumpout System and/or Storage Tank

Figure 18 — Optional Pumpout System Piping Schematic with Storage Tank

Figure 19 — Optional Pumpout System Piping Schematic without Storage Tank

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Figure 20 — Pumpout Unit

Install Vent Piping to Relief Devices

The 19XL chiller is factory equipped with relief devices on the cooler and condenser shells. Refer to Figure 21 and Table 6 for size and location of relief devices. Vent relief devices to the outdoors in accordance with ANSI/ASHRAE 15 (latest edition) Safety Code for Mechanical Refrigeration and all other applicable codes.

DANGER ⚠ **DANGER**

Refrigerant discharged into confined spaces can displace oxygen and cause asphyxiation.

1. If relief devices are manifolded, the cross-sectional area of the relief pipe must at least equal the sum of the areas required for individual relief pipes.
2. Provide a pipe plug near outlet side of each relief device for leak testing. Provide pipe fittings that allow vent piping to be disconnected periodically for inspection of valve mechanism.
3. Piping to relief devices must not apply stress to the device. Adequately support piping. A

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length of flexible tubing or piping near the device is essential on spring-isolated machines.

4. Cover the outdoor vent with a rain cap and place a condensation drain at the low point in the vent piping to prevent water build-up on the atmospheric side of the relief device.

Make Electrical Connections

Field wiring must be installed in accordance with job wiring diagrams and all applicable electrical codes.

CAUTION **CAUTION**

Do not run 120-v wiring into the control cabinet. The control cabinet should only be used for additional extra low-voltage wiring (50 v maximum).

Wiring diagrams in this publication (Figure 22, Figure 23, Figure 24, Figure 25, Figure 26, Figure 27, Figure 28, and Figure 29) are for reference only and are not intended for use during actual installation; follow job specific wiring diagrams.

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WARNING **WARNING**

Do not attempt to start compressor or oil pump (even for a rotation check) or apply test voltage of any kind while machine is under dehydration vacuum. Motor insulation breakdown and serious damage may result.

Connect Control Inputs

Connect the control input wiring from the chilled and condenser water flow switches to the starter terminal strip. Wiring may also be specified for a spare safety switch, and a remote start/stop contact can be wired to the starter terminal strip. Additional spare sensors and Carrier Comfort Network modules may be specified as well. These are wired to the machine control panel as indicated in Figure 22 and Figure 23.

Click here for Figure 21 — Relief Valve Locations

Click here for Figure 22 — Carrier Comfort Network Communication Bus Wiring

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Click here for Figure 23 — COMM1 CCN Communication Wiring for Multiple Chillers (Typical)

Connect Control Outputs

Connect auxiliary equipment, chilled and condenser water pumps, and spare alarms as required and indicated on job wiring drawings.

Connect Starter

The 19XL is available with either a unit-mounted, factory-installed starter or a free-standing, field-installed starter (Figure 24 and Figure 25).

Unit Mounted, Factory-Installed Starter

Attach power leads by connecting them from inside the starter cabinet to the line side circuit breaker terminals. See Figure 24 and Figure 26. Machines with electro-mechanical starters (wye-delta) will have a top hat shipped with the machine if the RLA is greater than 432 amps. The top hat is shipped in the knocked-down position and must be assembled and installed on top of the starter cabinet, over the line side circuit breaker. During assembly, remove the access plate and use it as the cover piece of the top hat. The top hat provides additional wire bending space to attach line side power leads to the circuit breaker within the starter. The solid-state starter does not require a top hat.

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IMPORTANT: Be sure to ground the power circuit in accordance with the National Electrical Code (NEC), applicable local codes, and job wiring diagrams. Also, make sure correct phasing is observed for proper rotation.

Click here for Figure 24 — 19XL with Optional Unit-Mounted Starter

Freestanding, Field-Installed Starter

Assemble and install compressor terminal box in desired orientation, and cut necessary conduit openings in conduit support plates. See Figure 25 and Figure 27. Attach power leads to compressor terminals in accordance with job wiring drawings, observing caution label in terminal box. Use only copper conductors. The motor must be grounded in accordance with NEC (National Electrical Code), applicable local codes, and job wiring diagrams. Installer is responsible for any damage caused by improper wiring between starter and compressor motor.

IMPORTANT: Do not insulate terminals until wiring arrangement has been checked and approved by Carrier start-up personnel. Also, make sure correct phasing is followed for proper motor rotation.

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Insulate Motor Terminals and Lead Wire Ends

Insulate compressor motor terminals, lead wire ends, and electrical wires to prevent moisture condensation and electrical arcing. For low-voltage units (up to 600 v), obtain insulation material from machine shipping package consisting of 3 rolls of insulation putty and one roll of vinyl tape.

1. Insulate each terminal by wrapping with one layer of insulation putty.
2. Overwrap putty with 4 layers of vinyl tape.

High Voltage Units

High-voltage units require special terminal preparation. Follow local electrical codes for high-voltage installation. The vinyl tape is not acceptable, a high voltage terminal methods must be used.

Connect Power Wires to Oil Pump Starter

See Figure 28. Connect power wires to oil pump starter mounted in machine power panel. Use separate fused disconnect or circuit breaker as shown on job wiring diagrams and Figure 27. Check that power supply voltage agrees with oil pump voltage. Follow correct phasing for proper motor rotation.

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CAUTION **CAUTION**

Do not punch holes or drill into the top surface of the power panel. Knockouts are provided in the bottom of the power panel for wiring connections.

Click here for Figure 25 — 19XL with Freestanding Starter

Click here for Figure 26 — 19XL Typical Field Wiring with Optional Unit-Mounted Starter

Click here for Figure 27 — 19XL Typical Field Wiring with Free-Standing Starter

Connect Power Wires to Oil Heater Contactor

Connect power wiring to oil heater contactor using a separate power source and fused disconnect. Refer to Figure 29 and wiring label on the machine power panel.

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Connect Wiring from Starter to Power Panel

Connect control wiring from main motor starter to the machine power panel. All control wiring must use shielded cable. Also, connect the communications cable. Refer to the job wiring diagrams for cable type and cable number. Make sure the control circuit is grounded in accordance with applicable electrical codes and instructions on machine control wiring label.

Click here for Figure 28 — Oil Pump Wiring

Click here for Figure 29 — Oil Heater and Control Power Wiring

Carrier Comfort Network Interface

The Carrier Comfort Network (CCN) communication bus wiring is supplied and installed by the electrical contractor. It consists of shielded, 3-conductor cable with drain wire.

The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system element on either side of it. The negative pins must be wired to the negative pins. The signal ground pins must be wired to the signal ground pins. See Figure 22 for location of the CCN network connector (COMM1) on the processor module.

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Note: Conductors and drain wire must be 20 AWG (American Wire Gauge) minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/ nylon, vinyl, Teflon, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/ nylon, chrome vinyl, or Teflon with a minimum operating temperature range of -4 F to 140 F (-20 C to 60 C) is required. See table below for cables that meet the requirements.

Manufacturer	Cable No.
Alpha	2413 or 5463
American	A22503
Belden	8772
Columbia	02525

When connecting the CCN communication bus to a system element, a color code system for the entire network is recommended to simplify installation and checkout. The following color code is recommended:

Signal Type	CCN Bus Conductor Insulation Color	COMM1 Plug PIN No.
+ **Ground** **–**	Red White Black	1 2 3

If a cable with a different color scheme is selected, a similar color code should be adopted for the entire network.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous shield must be connected to ground at only one single point. See Figure 23. If the communication bus cable exits from one building and enters another, the shields must be connected to ground at the lightening suppressor in each building where the cable enters or exits the building (one point only).

To connect the 19XL chiller to the network, proceed as follows (Figure 23):

1. Cut power to the PIC control panel.
2. Remove the COMM1 plug from the processor module.
3. Cut a CCN wire and strip the ends of the RED, WHITE, and BLACK conductors.
4. Using a wirenut, connect the drain wires together.
5. Insert and secure the RED wire to Terminal 1 of the COMM1 plug.
6. Insert and secure the WHITE wire to Terminal 2 of the COMM1 plug.
7. Insert and secure the BLACK wire to Terminal 3 of the COMM1 plug.
8. Mount a terminal strip in a convenient location.
9. Connect the opposite ends of each conductor to separate terminals on the terminal strip.
10. Cut another CCN wire and strip the ends of the conductors.

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11. Connect the RED wire to the matching location on the terminal strip.

12. Connect the WHITE wire to the matching location on the terminal strip.

13. Connect the BLACK wire to the matching location on the terminal strip.

Install Field Insulation

CAUTION **CAUTION**

Protect insulation from weld heat damage and weld splatter. Cover with wet canvas cover during water piping installation.

When installing insulation at the job site, insulate the following components:

- compressor motor
- cooler shell
- cooler tube sheets
- suction piping
- motor cooling drain
- oil reclaim piping
- oil cooler refrigerant side tubing
- refrigerant liquid line to cooler

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Note: Insulation of the waterbox covers is applied only at the jobsite by the contractor. When insulating the covers, make sure there is access for removal of waterbox covers for servicing (Figure 30).

Click here for Figure 30 — 19XL Insulation Area

Click here for 19XL Installation Start-up Request Checklist CL-1, CL-2 (Print and use for job file)

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Table 1 — 19XL Compressor/Motor Weights

Motor Size	English						SI					
	Com-pressor Weight (lb)	Stator Weight (lb)		Rotor Weight (lb)		End Bell Cover (lb)	Com-pressor Weight (kg)	Stator Weight (kg)		Rotor Weight (kg)		End Bell Cover (kg)
		60 Hz	50 Hz	60 Hz	50 Hz			60 Hz	50 Hz	60 Hz	50 Hz	
CB	2660	1135	1147	171	233	250	1208	515	520	78	106	114
CC	2660	1143	1150	197	239	250	1208	218	522	90	109	114
CD	2660	1153	1213	234	252	250	1208	523	551	106	114	114
CE	2660	1162	1227	237	255	250	1208	528	557	108	116	114
CL	2660	1202	1283	246	270	250	1208	546	582	112	123	114
CM	2660	1225	1308	254	275	250	1208	556	594	115	125	114
CN	2660	1276	1341	263	279	250	1208	579	609	119	127	114
CP	2660	1289	1356	266	284	250	1208	585	616	121	129	114
CQ	2660	1306	1363	273	287	250	1208	593	619	124	130	114
CR	2660	1335	1384	282	294	250	1208	606	628	128	133	114

Note: For medium voltage motors add 85 lbs (39 kg) to above for 60-Hz motors and 145 lbs (66 kg) for 50-Hz motors. Total compressor/motor weight is the sum of the compressor, stator, rotor, and end bell cover weight. Compressor weight includes suction and discharge elbow weights.

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Table 2 — 19XL Component Weights

Component	lb	kg
Suction Elbow*	54	25
Discharge Elbow*	46	21
Control Cabinet†	30	14
Optional Mounted Starter**	500	227

Legend

*Included in total compressor weight.

†Included in total cooler weight.

**Weight of optional factory-mounted starter is not included and must be added to heat exchanger weights.

Contents

Table 3 — 19XL Heat Exchanger Weights

Code	English						SI					
	Rigging Wt (lb)*		Machine Charge				Rigging Wt (kg)*		Machine Charge			
	Cooler Only	Con-denser Only	Refrigerant (lb)†		Water (gal.)		Cooler Only	Con-denser Only	Refrigerant (kg)†		Water (L)	
			Cooler	Con-denser	Cooler	Con-denser			Cooler	Con-denser	Cooler	Con-denser
40	5154	4643	920	350	53	56	2340	2108	417	159	200	212
41	5275	4771	990	350	58	62	2395	2166	449	159	219	235
42	5418	4909	1050	350	64	68	2460	2229	476	159	242	257
43	5577	5064	1100	350	71	75	2532	2299	499	159	269	284
50	6730	6413	1300	350	79	84	3055	2912	590	159	299	318
51	6927	6584	1350	350	87	92	3145	2989	612	159	329	348
52	7140	6780	1430	350	96	101	3242	3078	649	159	363	382
53	7359	7005	1500	350	104	110	3341	3180	681	159	394	416
55	8220	8008	1840	490	104	112	3728	3632	835	222	394	424
56	8517	8260	1910	490	115	123	3863	3746	866	222	435	466
57	8836	8560	2020	490	128	135	4007	3882	916	222	485	511
58	9164	8900	2120	490	140	19	4156	4037	961	222	530	564

* Rigging weights are for standard tubes of standard wall thickness. For special tubes refer to the 19XL Computer Selection Program.

† Refrigerant charge listed is the same for both HCFC-22 and HFC-134a.

Contents

Table 4 — Additional Heat Exchanger Weight for Marine Waterboxes*

Heat Exchanger Frame, Pass	English				SI			
	Rigging Wt (lb)		Water Volume (gal.)		Rigging Wt (kg)		Water Volume (gal.)	
	Cooler	Con-denser	Cooler	Con-denser	Cooler	Con-denser	Cooler	Con-denser
Frame 4, 2 Pass	1115	660	69	51	506	300	261	193
Frame 4,1 & 3 Pass	2030	1160	138	101	922	527	524	384
Frame 5, 2 Pass	1220	935	88	64	554	424	331	243
Frame 5,1 & 3 Pass	2240	1705	175	128	1017	771	663	486

*Add to heat exchanger weights for total weight.

Contents

Table 5A — 19XL Waterbox Cover Weights (English)*

English (Lb)									
Heat Exchanger	**Waterbox Description**	**Frame 4, Std Nozzles**		**Frame 4, Flanged**		**Frame 5, Std Nozzles**		**Frame 5, Flanged**	
		150 psig	**300 psig**	**150 psig**	**300 psig**	**150 psig**	**300 psig**	**150 psig**	**300 psig**
Coolers	NIH, 1 Pass Cover	284	414	324	491	412	579	452	655
	NIH, 2 Pass Cover	285	411	341	523	410	573	466	685
	NIH, 3 Pass Cover	292	433	309	469	423	602	440	638
	NIH, Plain End Cover	243	292	243	292	304	426	3044	426
	MWB Cover	CS	621	CS	621	CS	766	CS	766
	Plain End Cover	CS	482	CS	482	CS	471	CS	471
Con-densers	NIH, 1 Pass Cover	306	446	346	523	373	472	413	549
	NIH, 2 Pass Cover	288	435	344	547	368	469	428	541
	NIH, 3 Pass Cover	319	466	336	502	407	493	419	549
	NIH, Plain End Cover	226	271	226	271	271	379	271	379
	MWB Cover	CS	474	CS	474	CS	590	CS	590
	Plain End Cover	CS	359	CS	359	CS	428	CS	428

Legend

CS — Contact Syracuse

MWB — Marine Waterbox

NIH — Nozzle-In-Head

* These weights are for reference only. The 150 psig (1034 kPa) standard waterbox cover weights have been included in the heat exchanger weights shown in Table 3 and Table 4.

Contents

Table 5B — 19XL Waterbox Cover Weights (SI)*

SI (kg)									
Heat Exchanger	**Waterbox Description**	**Frame 4, Std Nozzles**		**Frame 4, Flanged**		**Frame 5, Std Nozzles**		**Frame 5, Flanged**	
		1034 kPa	**2068 kPa**	**1034 kPa**	**2068 kPa**	**1034 kPa**	**2068 kPa**	**1034 kPa**	**2068 kPa**
Coolers	NIH, 1 Pass Cover	129	188	148	223	187	262	205	297
	NIH, 2 Pass Cover	129	187	155	237	186	260	212	311
	NIH, 3 Pass Cover	133	197	140	213	192	273	200	290
	NIH, Plain End Cover	110	133	110	133	138	193	138	193
	MWB Cover	CS	282	CS	282	CS	348	CS	348
	Plain End Cover	CS	219	CS	219	CS	214	CS	214
Con-densers	NIH, 1 Pass Cover	139	202	157	237	169	214	188	249
	NIH, 2 Pass Cover	131	197	156	248	167	213	194	246
	NIH, 3 Pass Cover	145	212	153	228	185	224	190	249
	NIH, Plain End Cover	103	123	103	123	123	172	123	172
	MWB Cover	CS	215	CS	215	CS	268	CS	268
	Plain End Cover	CS	163	CS	163	CS	194	CS	194

Legend

CS — Contact Syracuse

MWB — Marine Waterbox

NIH — Nozzle-In-Head

* These weights are for reference only. The 150 psig (1034 kPa) standard waterbox cover weights have been included in the heat exchanger weights shown in Table 3 and Table 4.

Contents

Table 6 — Relief Device Locations

Relief Valve Outlet Size	Location	Quantity
1-in. NPT Female Connector	Cooler	1
1-in. NPT Female Connector	Condenser	2
1-in. NPT Female Connector	Optional Storage Tank	2

Contents

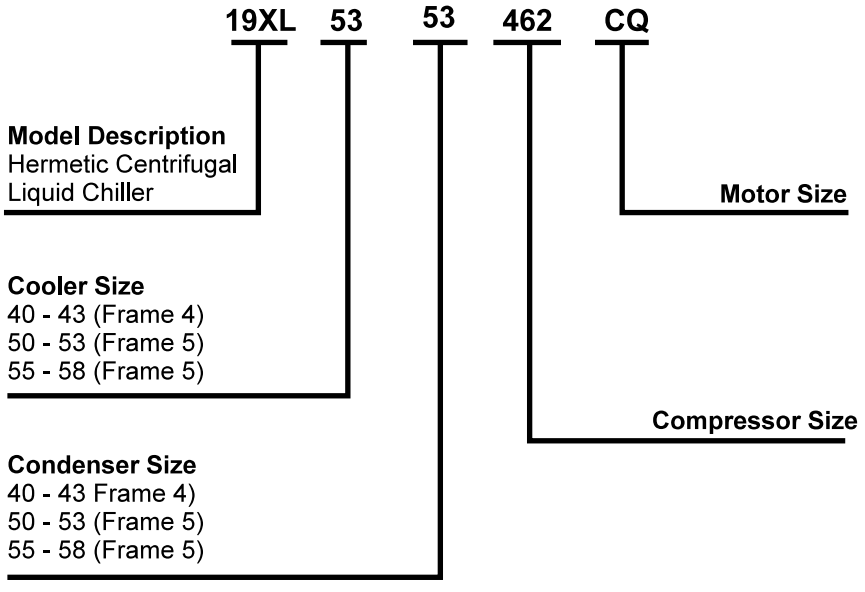


Figure 1 — Model Number Identification

Contents

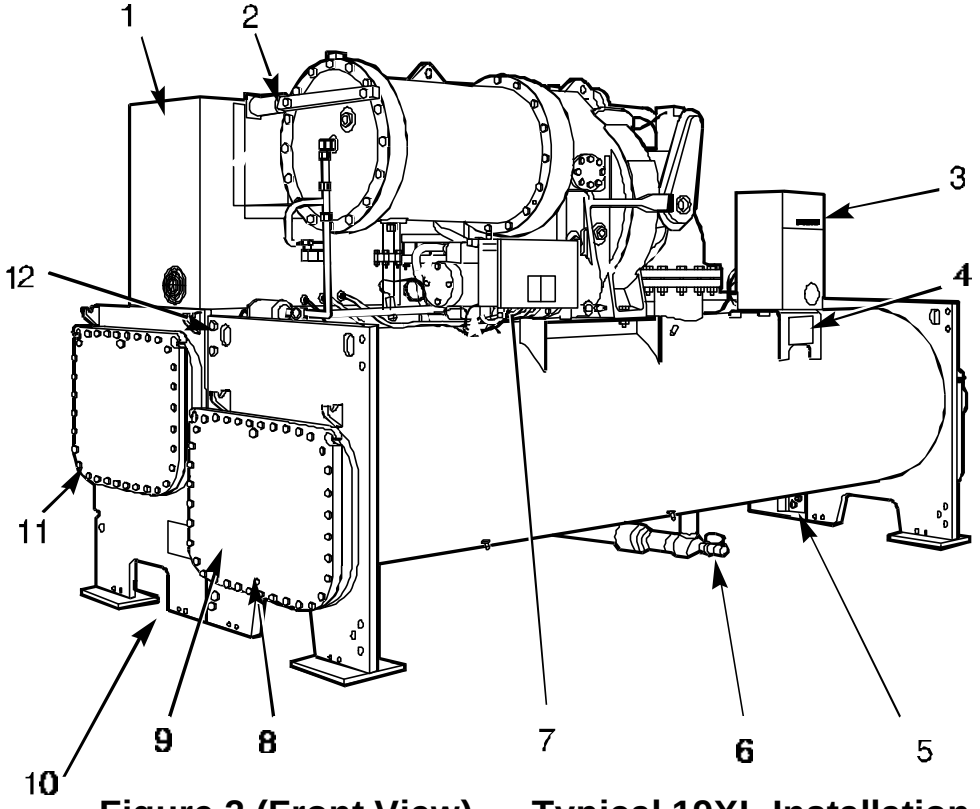


Figure 2 (Front View) — Typical 19XL Installation (300 to 600 Tons [1055 to 2110 kW])

(See next page for Rear View)

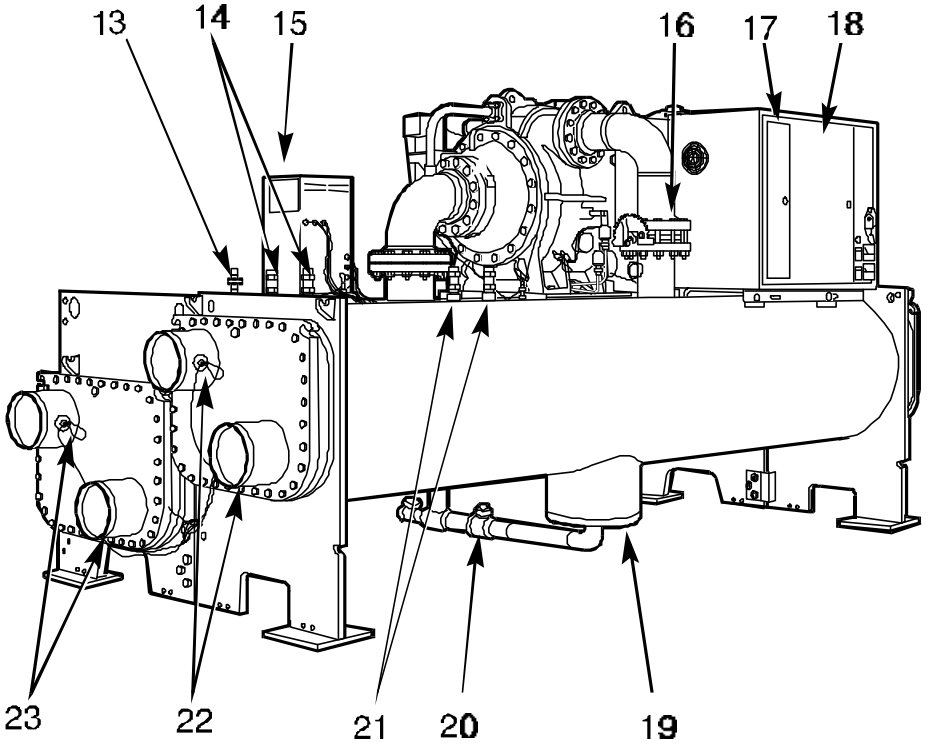
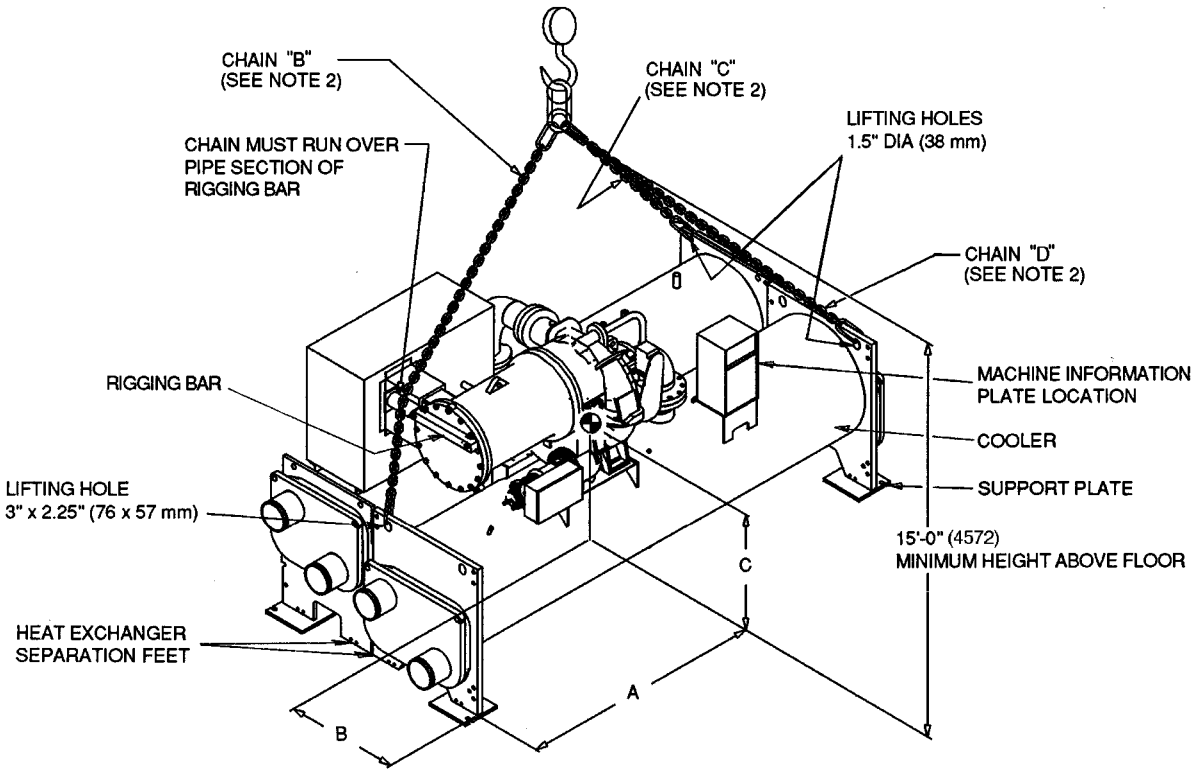


Figure 2 (Rear View) — Typical 19XL Installation (300 to 600 Tons [1055 to 2110 kW])

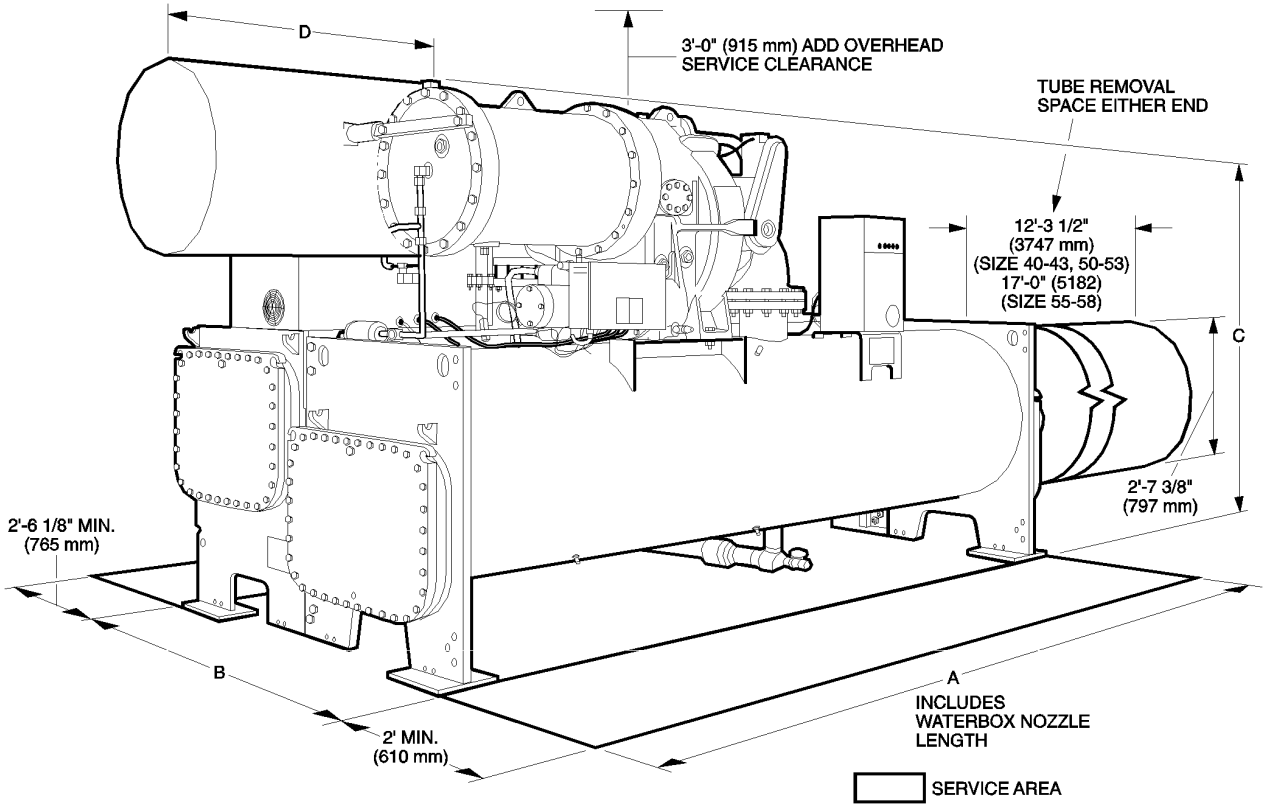


Heat Exchanger (Cooler and Condenser) Size	Center of Gravity — Approximate Dimensions						Maximum Rigging Weight (Without Refrigerant Charge)	
	A (Length)		B (Width)		C (Height)			
	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	lb	kg
40 to 43 (Frame 4)	5-5	1689	2-8	813	3-5	1040	21,200	9,616
50 to 53 (Frame 5)	5-5	1689	2-8	813	3-5	1040	26,400	11,975
55 to 58 (Frame 5)	7-9	2362	2-8	813	3-5	1040	30,850	14,000

Vessel Length		Chain Length					
		"B"		"C"		"D"	
ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
12-3	3734	12-0	3658	12-10	3912	12-10	3912
12-3	3734	12-0	3658	12-10	3912	12-10	3912
17-0	5182	13-9	4166	14-10	4521	14-10	4521

Figure 3 — Machine Rigging Guide

Contents



Heat Exchanger Code (Cooler and Condenser)	A (Length)				B (Width)		C (Height)		Nozzle Size (in.) (Nominal Pipe Size)		
	2 Pass*		1 or 3 Pass†								
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	1-Pass	2-Pass	3-Pass
40-43	13-7 3/4	4159	14-3 1/4	4350	5-5 3/4	1670	6-8 5/8	2048	10	8	6
50-53	13-8	4166	14-3 3/4	4362	6-0 1/4	1835	7-2 1/8	2188	10	8	6
55-58	18-4 1/2	5601	19-0 1/4	5798	6-0 1/4	1835	7-2 1/8	2188	10	8	6

Heat Exchanger Code (Cooler and Condenser)	A (Length with Marine Waterbox — Not Shown)			
	2 Pass*		1 or 3 Pass†	
	ft-in.	mm	ft-in.	mm
40-53	14-9 5/8	4512	16-5 1/2	5017
55-58	19-6 1/8	5947	21-5 1/2	6541

Motor Service Clearance D	
ft-in.	mm
4-0	1219

Figure 4 — 19XL Dimensions

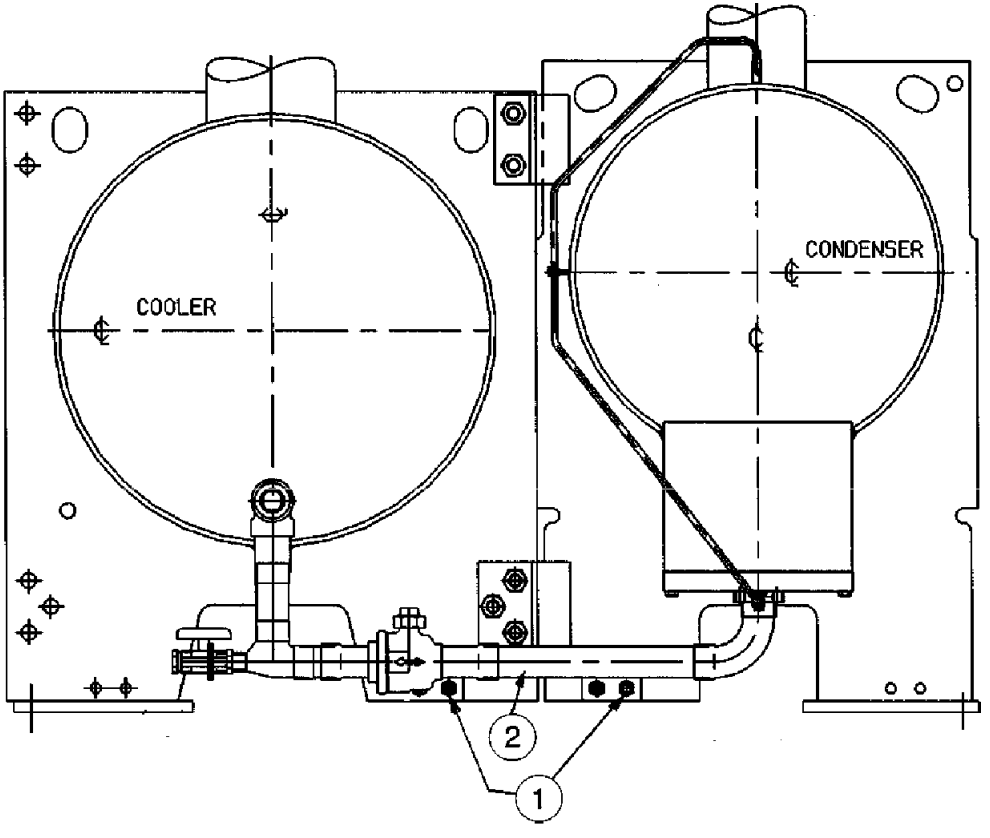


Figure 5 — 19XL Condenser Drain

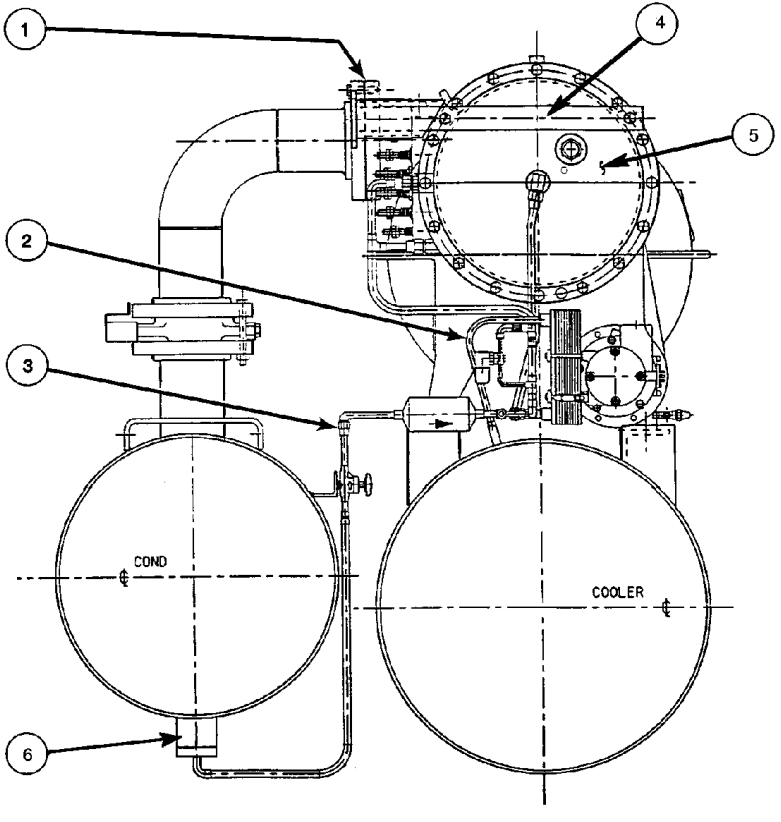


Figure 6 — 19XL Motor End View

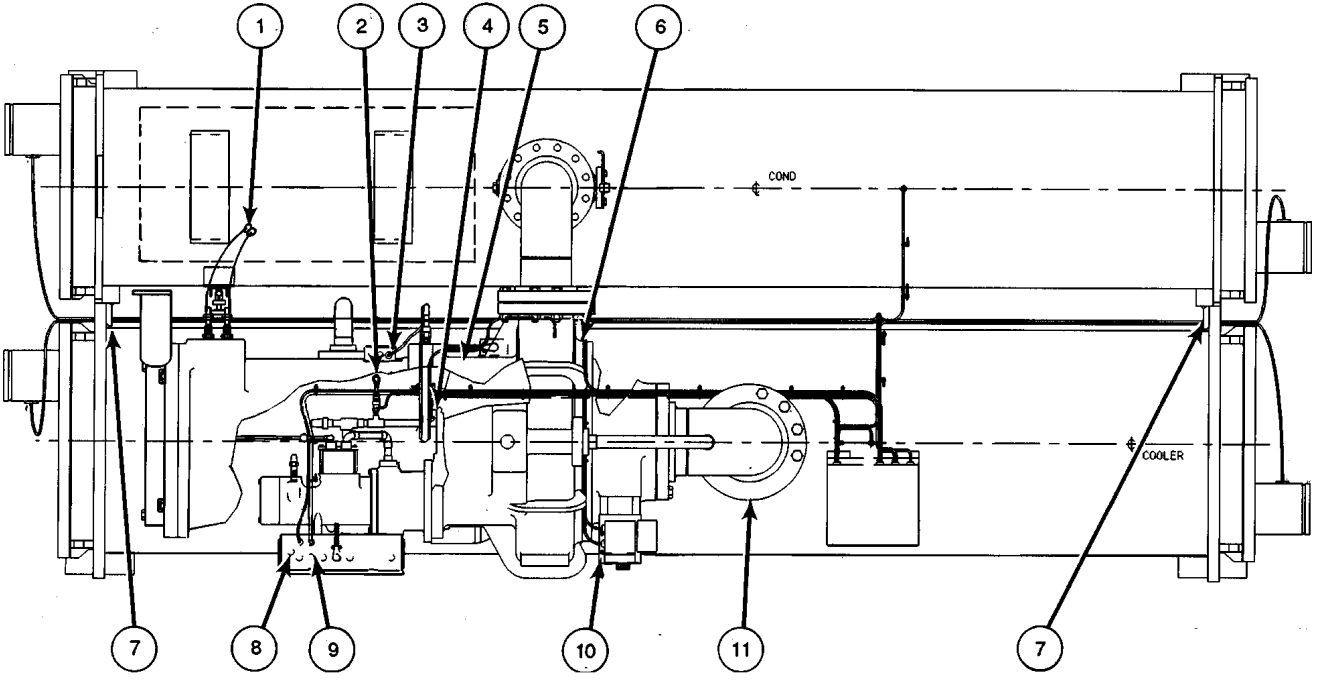


Figure 7 — 19XL Machine Top View

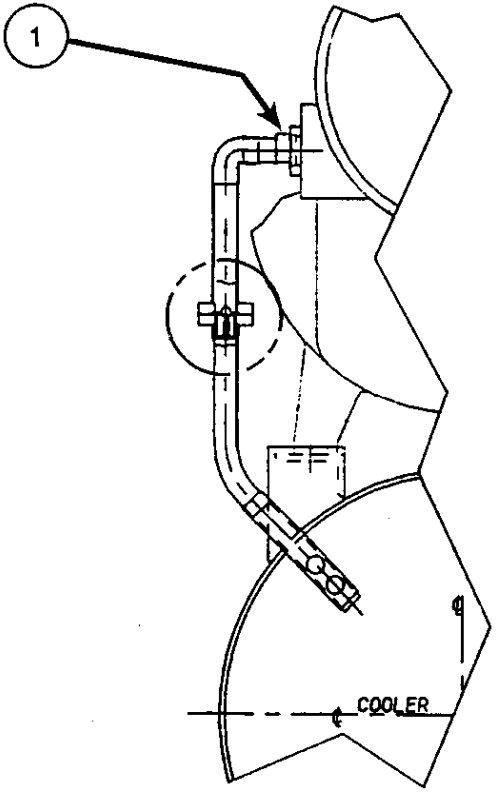


Figure 8 — 19XL Refrigerant Return

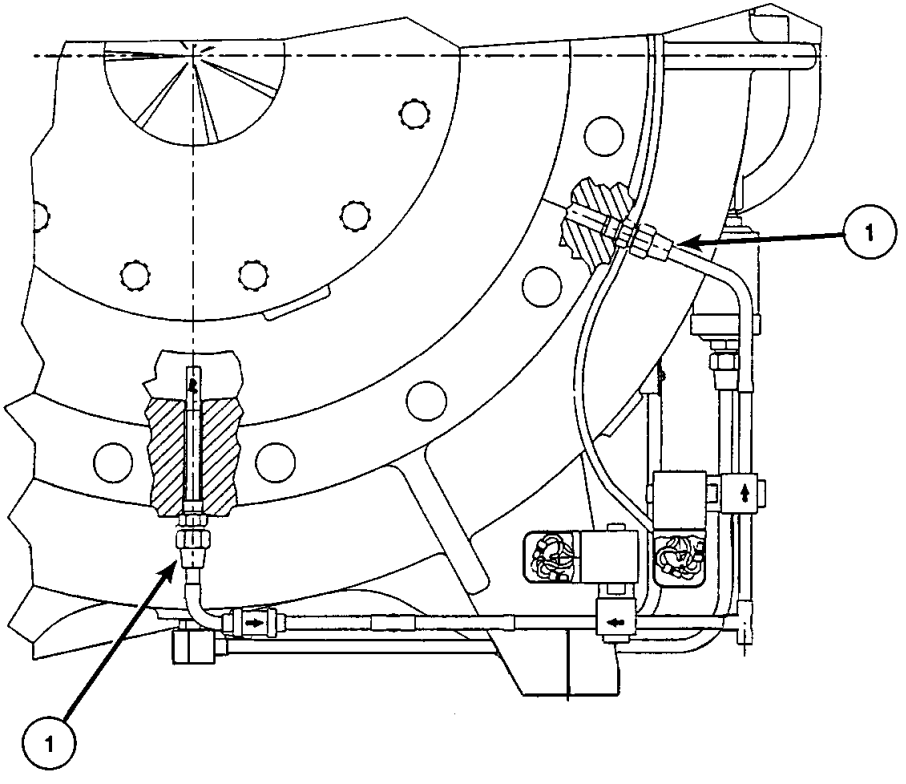
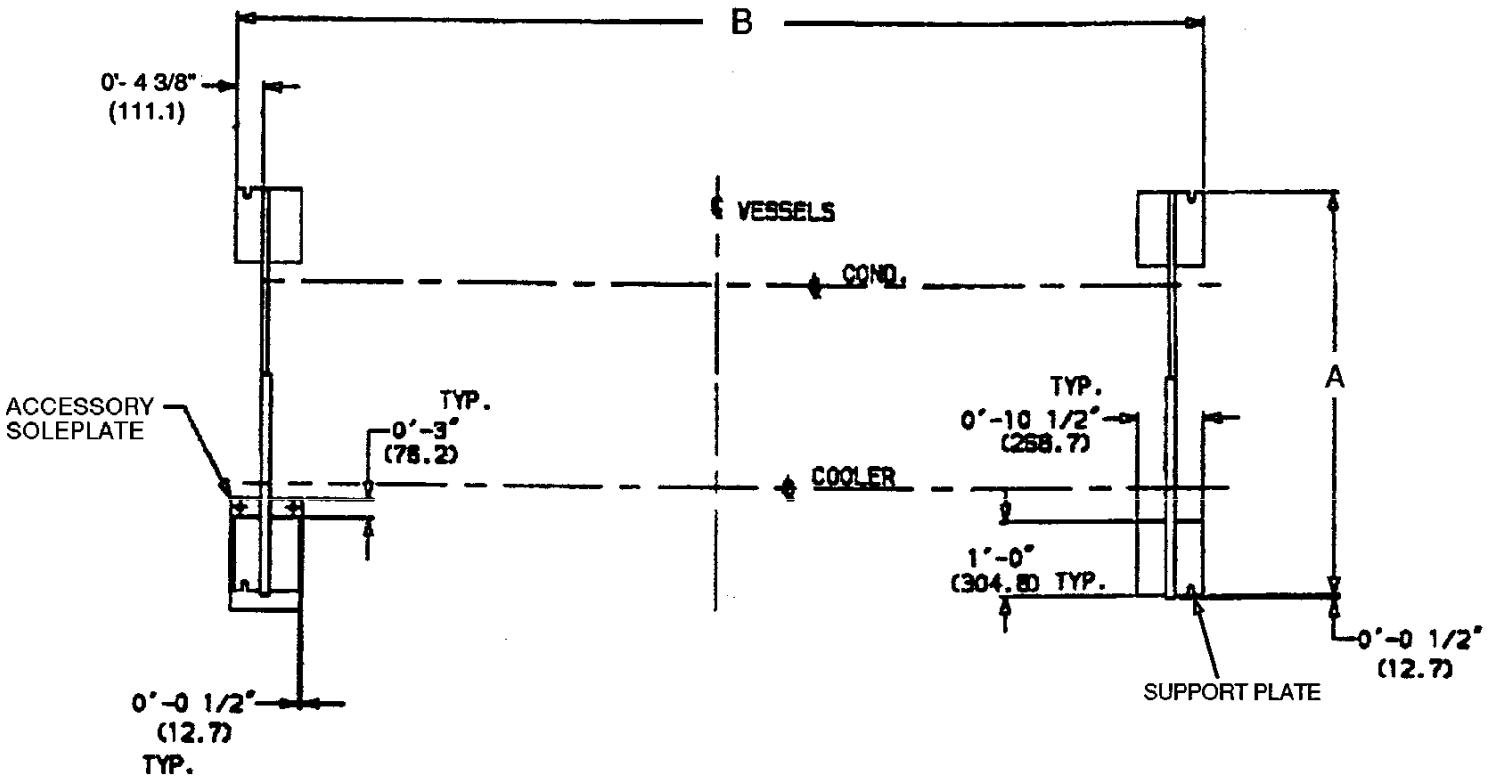


Figure 9 — 19XL Oil Reclaim System



Heat Exchanger (Cooler/ Condenser)	A		B	
	ft-in.	mm	ft-in.	mm
40-43	5-5 3/4	1670	13-0 1/4	3968
50-53	6-0 1/4	1835	13-0 1/4	3968
55-58	6-0 1/4	1835	17-8 3/4	5404

Figure 10 — 19XL Machine Footprint

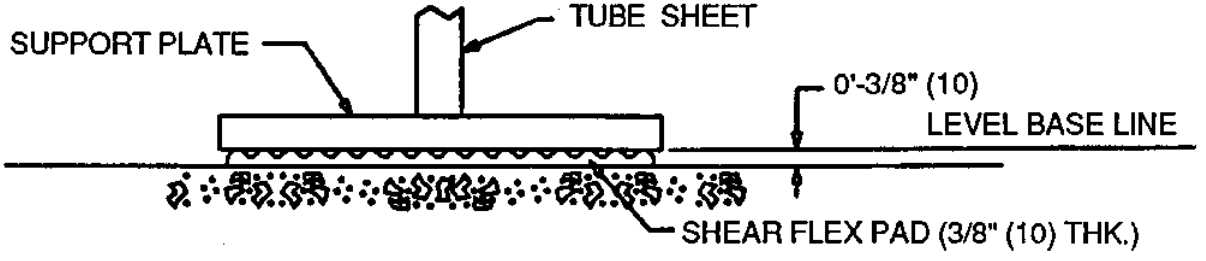


Figure 11 — Standard Isolation

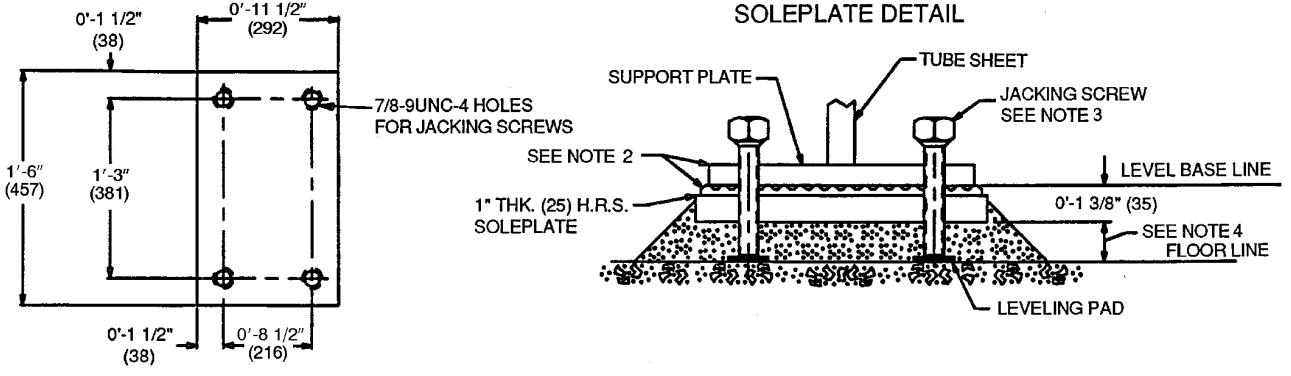


Figure 12 — Accessory Isolation

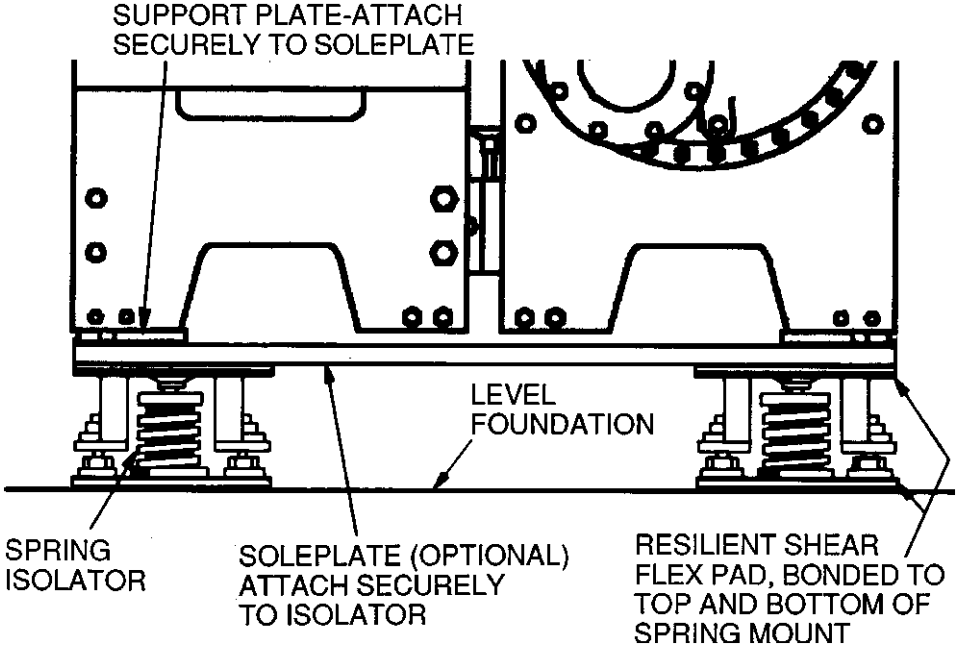


Figure 13 — 19XL Accessory Spring Isolation (Shown with Accessory Soleplates)

Contents

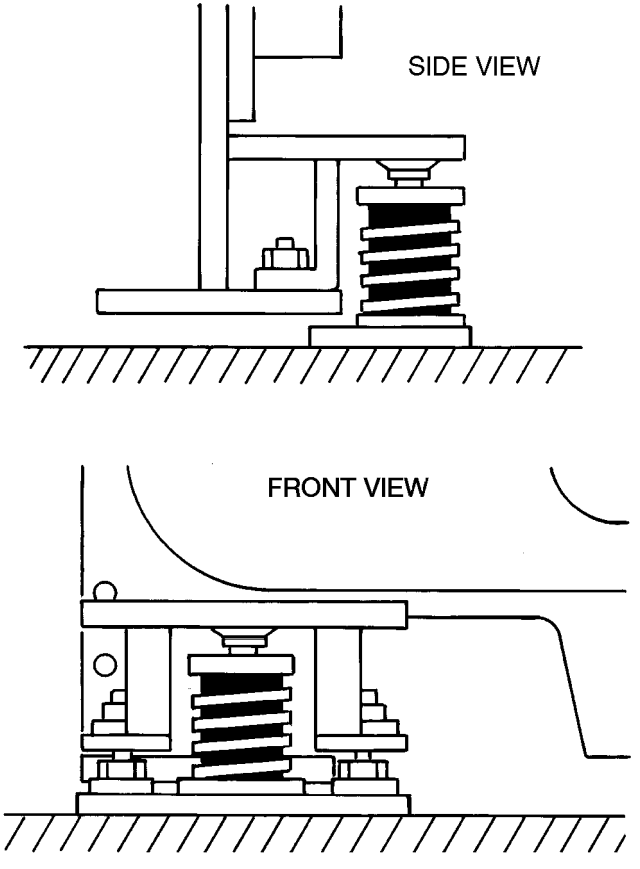
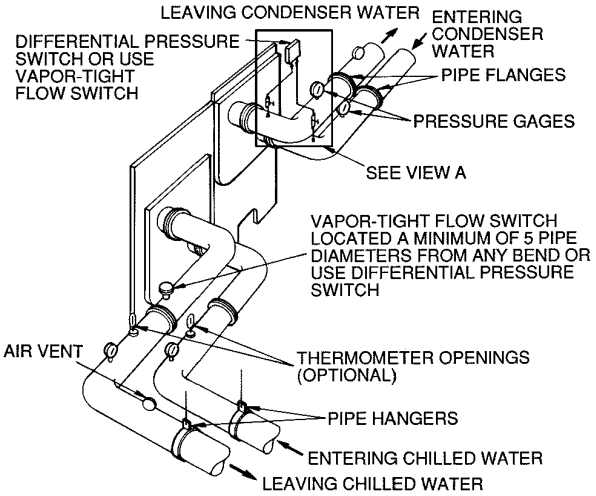


Figure 14 — Typical 19XL Low Profile Isolation Assembly


LEAVING CONDENSER WATER
ENTERING CONDENSER WATER
DIFFERENTIAL PRESSURE SWITCH OR USE VAPOR-TIGHT FLOW SWITCH
PIPE FLANGES
PRESSURE GAGES
SEE VIEW A
VAPOR-TIGHT FLOW SWITCH LOCATED A MINIMUM OF 5 PIPE DIAMETERS FROM ANY BEND OR USE DIFFERENTIAL PRESSURE SWITCH
AIR VENT
THERMOMETER OPENINGS (OPTIONAL)
PIPE HANGERS
ENTERING CHILLED WATER
LEAVING CHILLED WATER

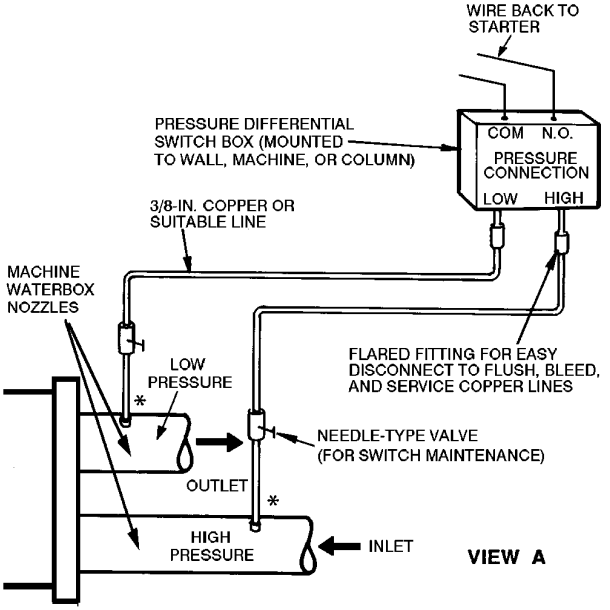
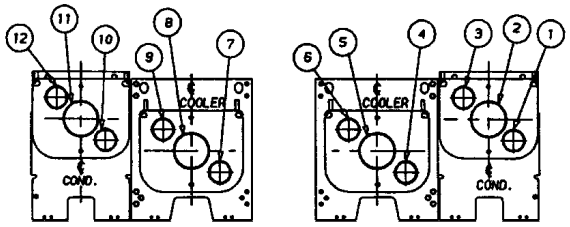
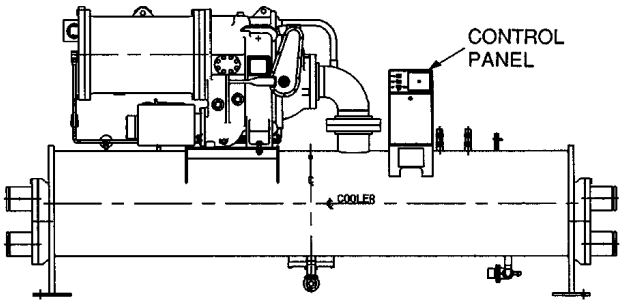


Figure 15 — Typical Nozzle Piping



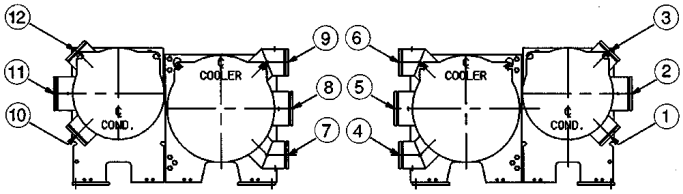
Drive End Compressor End

Nozzle-in-Head Waterboxes



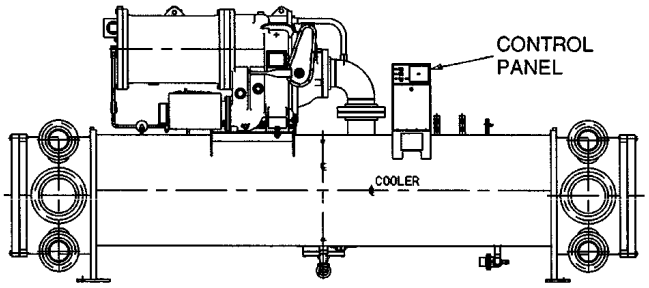
Drive End Compressor End

Front View



Drive End Compressor End

Marine Waterboxes



Drive End Compressor End

Front View

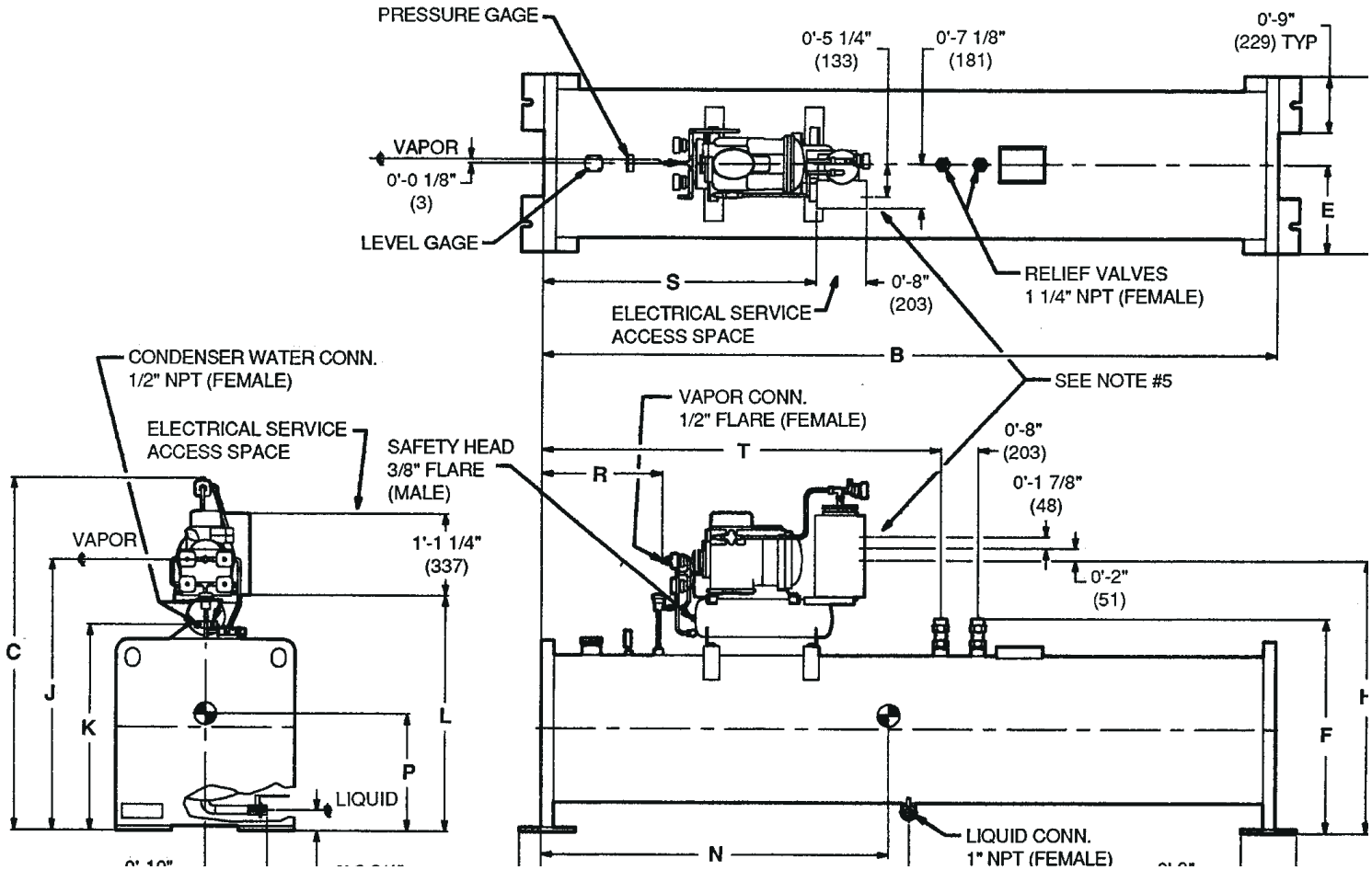
Nozzle Arrangement Codes

Cooler Waterboxes				Condenser Waterboxes		
Pass	In	Out	Arrangement Code	In	Out	Arrangement Code
1	8	5	A	11	2	P
	5	8	B	2	11	Q
2	7	9	C	10	12	R
	4	6	D	1	3	S
3	7	6	E	10	3	T
	4	9	F	1	12	U

Waterbox Nozzle Sizes

Pass	Nominal Pipe Size (in.)		Actual Pipe ID (in.)	Actual Pipe OD (in.)
	Cooler	Condenser	Cooler/Condenser	
1	10	10	10,020	10,750
2	8	8	7,981	8,625
3	6	6	6,065	6,625

Figure 16 — Piping Flow Data



Denotes center of gravity

Dimensions—English (ft-in.)

Tank Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
0428	10-5	9-10	4-9	2-4 3/4	1-2 3/8	2-10 3/4	4-11	3-8 1/8	3-6	2-9 7/16	3-2	0-3 1/2	4-8 3/4	1-7 7/8	1-7 5/16	3-7 3/4	5-4
0452	14-11 1/4	14-4 1/2	5-0 7/8	2-8 1/2	1-4 1/4	3-2	7-2 1/4	4-0	3-11 7/8	3-1 5/16	3-5 7/8	0-3 3/8	7-1 1/2	1-8 3/4	1-7 9/16	3-8	5-4 1/4

SI (mm)

Tank Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
0428	3175	2997	1448	730	365	883	1499	1121	1067	849	965	89	1442	505	491	1111	1626
0452	4553	4382	1546	826	413	965	2191	1219	1216	948	1064	86	2172	528	497	1118	1632

Figure 17 — Optional Pumpout System and/or Storage Tank (Page 1 of 2)

Contents

QTY	Trade Size	Location
1	1/2”	top
1	3/4”	bottom
1	1”	middle
1	1 1/4”	middle

Rated Dry Weight and Refrigerant Capacity

English (lb)						
Tank Size	Tank OD (in.)	Dry Weight* (lb)	Maximum Refrigerant Capacity (lb)			
			ASHRAE 15		ARI 495	
			(HCFC-22)	(HFC-134a)	(HCFC-22)	(HFC-134a)
0428	24.00	2200	1840	2025	1645	1810
0452	27.25	3270	3525	3880	3155	3465

SI (kg)						
Tank Size	Tank OD (mm)	Dry Weight* (kg)	Maximum Refrigerant Capacity (kg)			
			ASHRAE 15		ARI 495	
			(HCFC-22)	(HFC-134a)	(HCFC-22)	(HFC-134a)
0428	610	998	835	928	747	822
0452	592	1606	1599	1760	1431	1572

Figure 17 — Optional Pumpout System and/or Storage Tank (Continued)

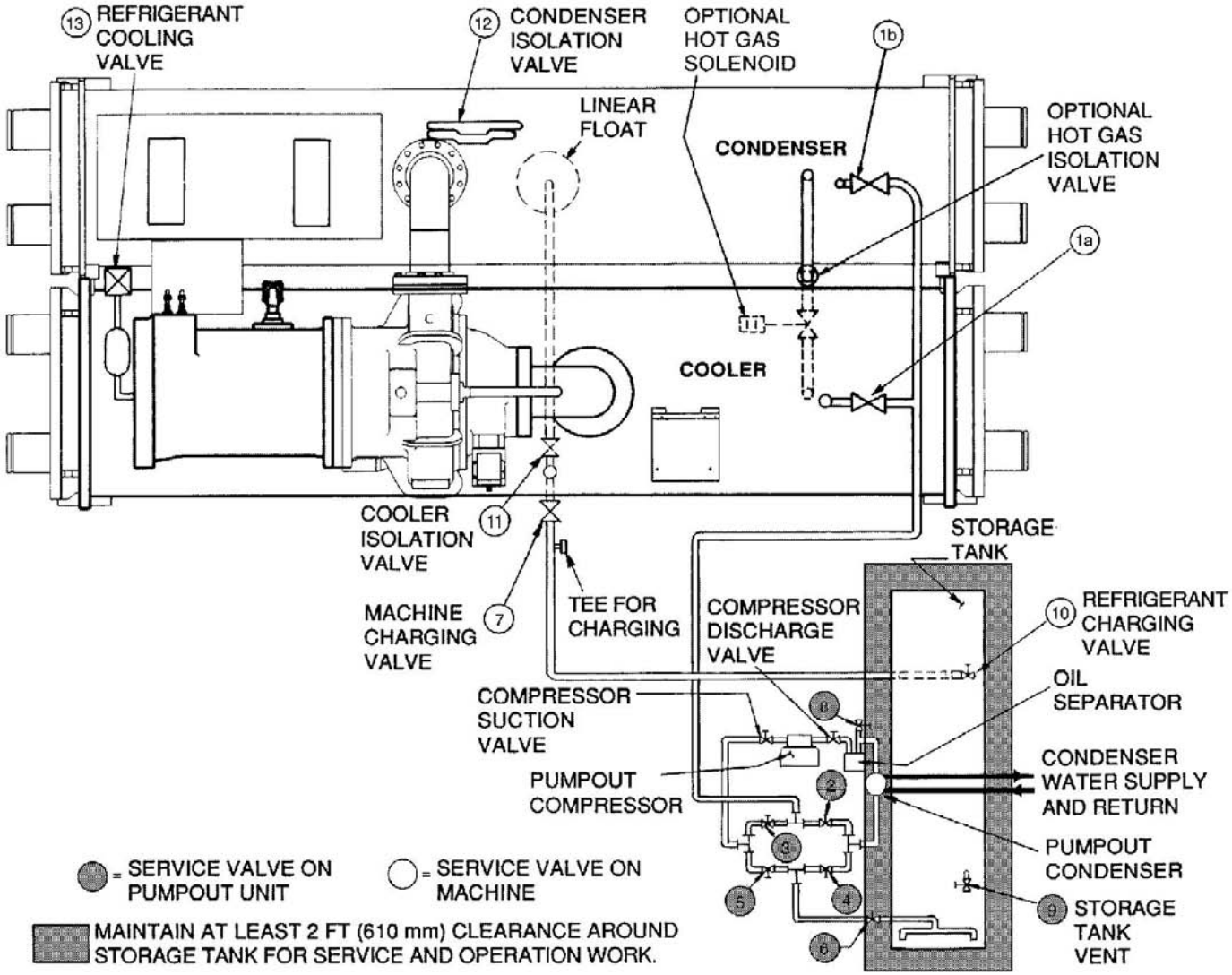


Figure 18 — Optional Pumpout System Piping Schematic with Storage Tank

Contents

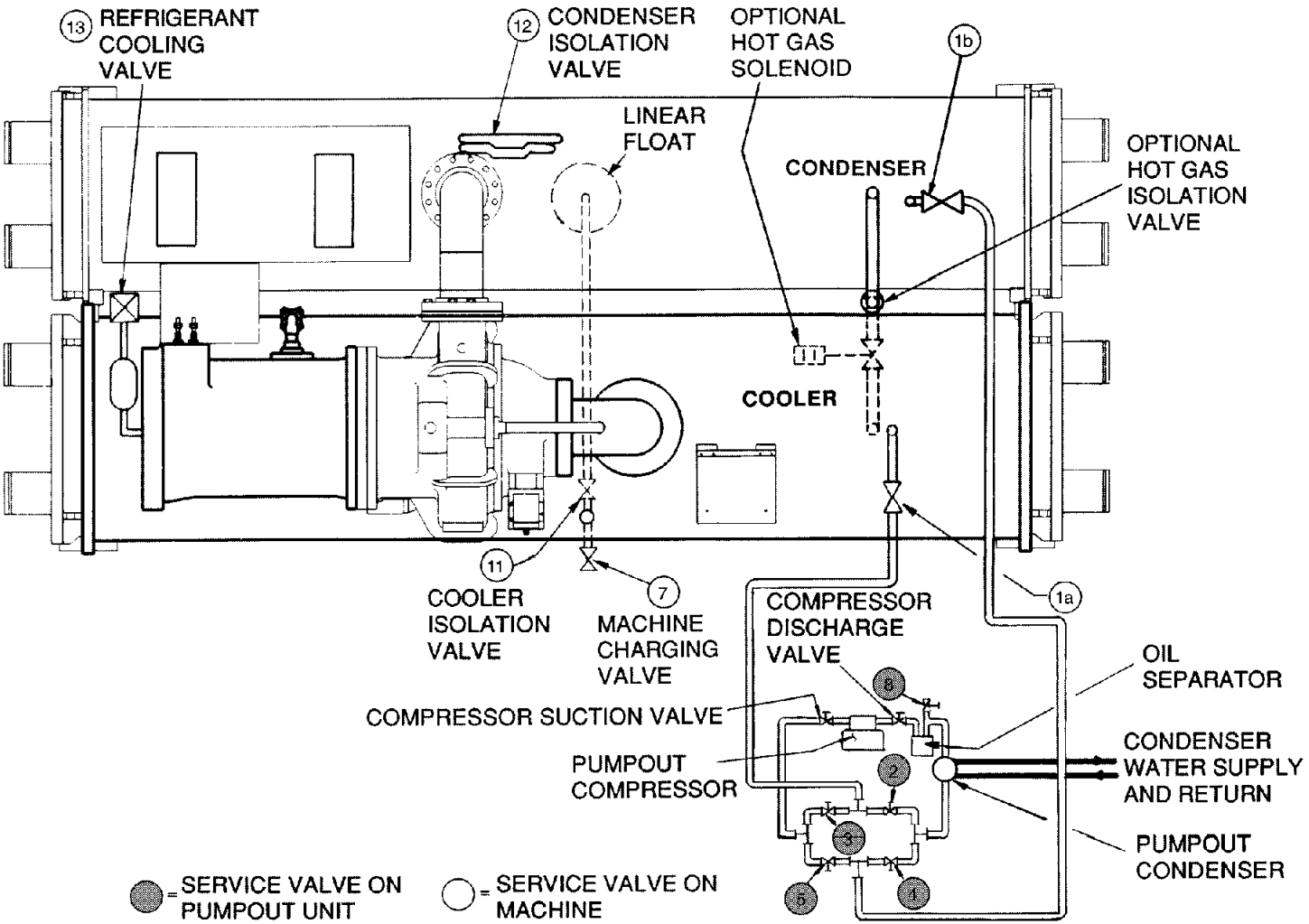


Figure 19 — Optional Pumpout System Piping Schematic without Storage Tank

Contents

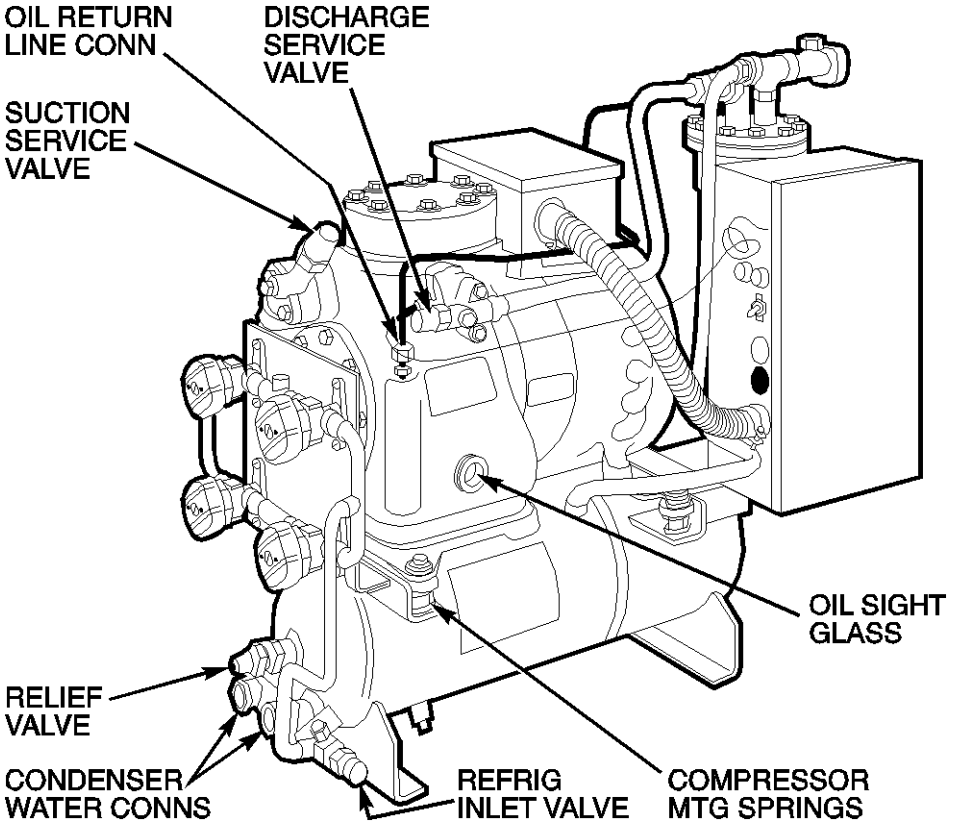


Figure 20 — Pumpout Unit

Contents

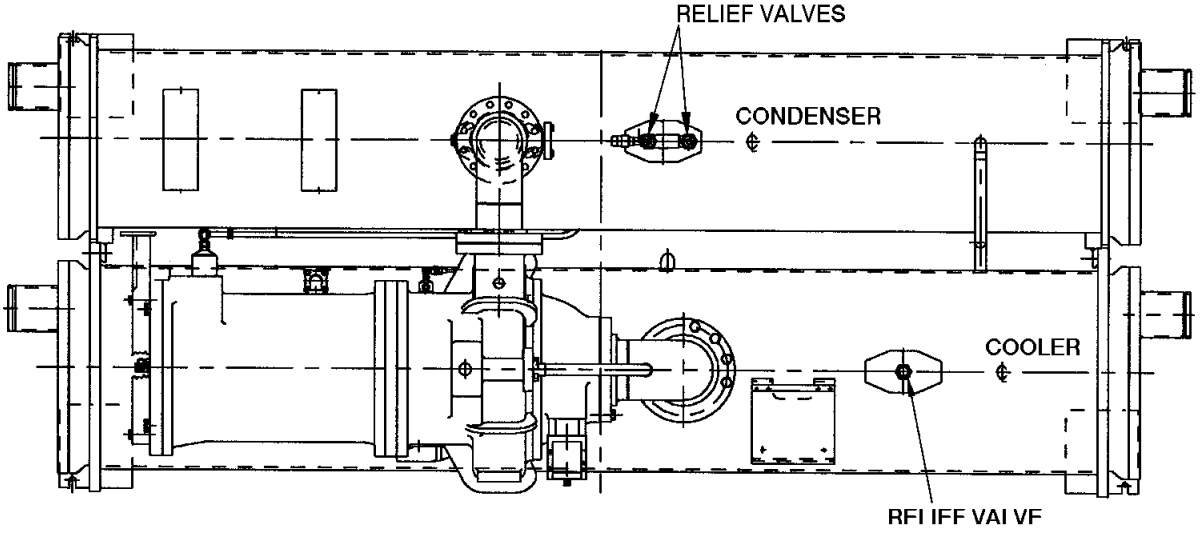


Figure 21 — Relief Valve Locations

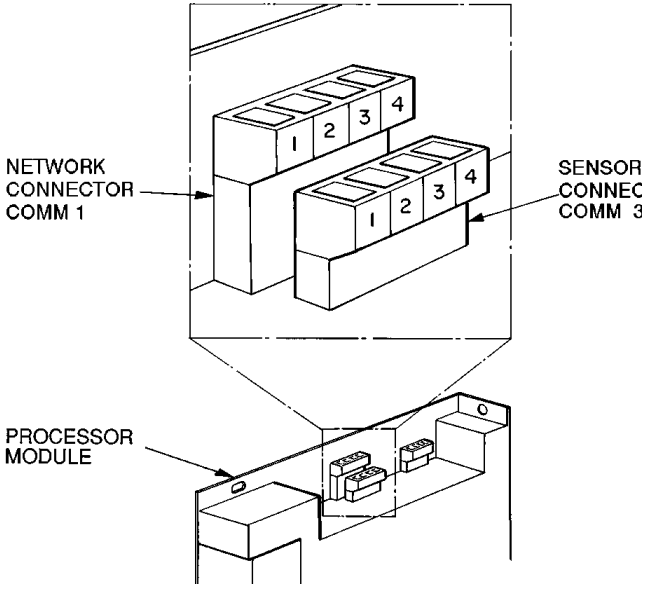


Figure 22 — Carrier Comfort Network Communication Bus Wiring

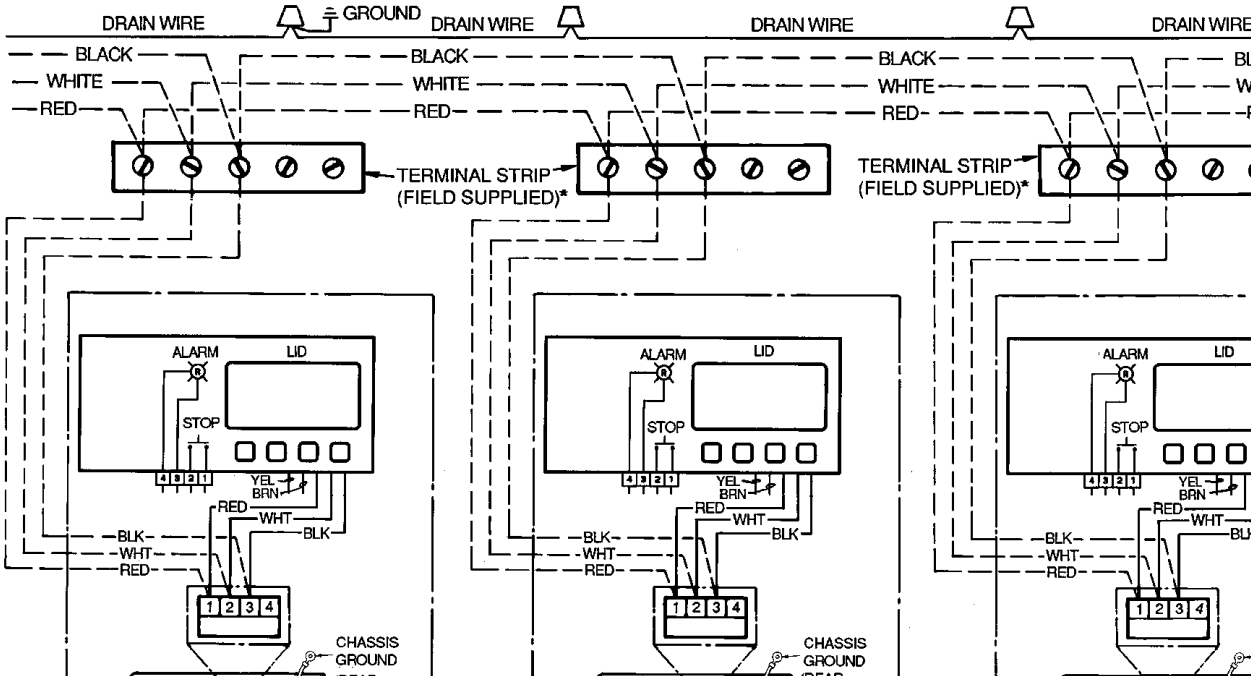


Figure 23 — COMM1 CCN Communication Wiring For Multiple Chillers (Typical)

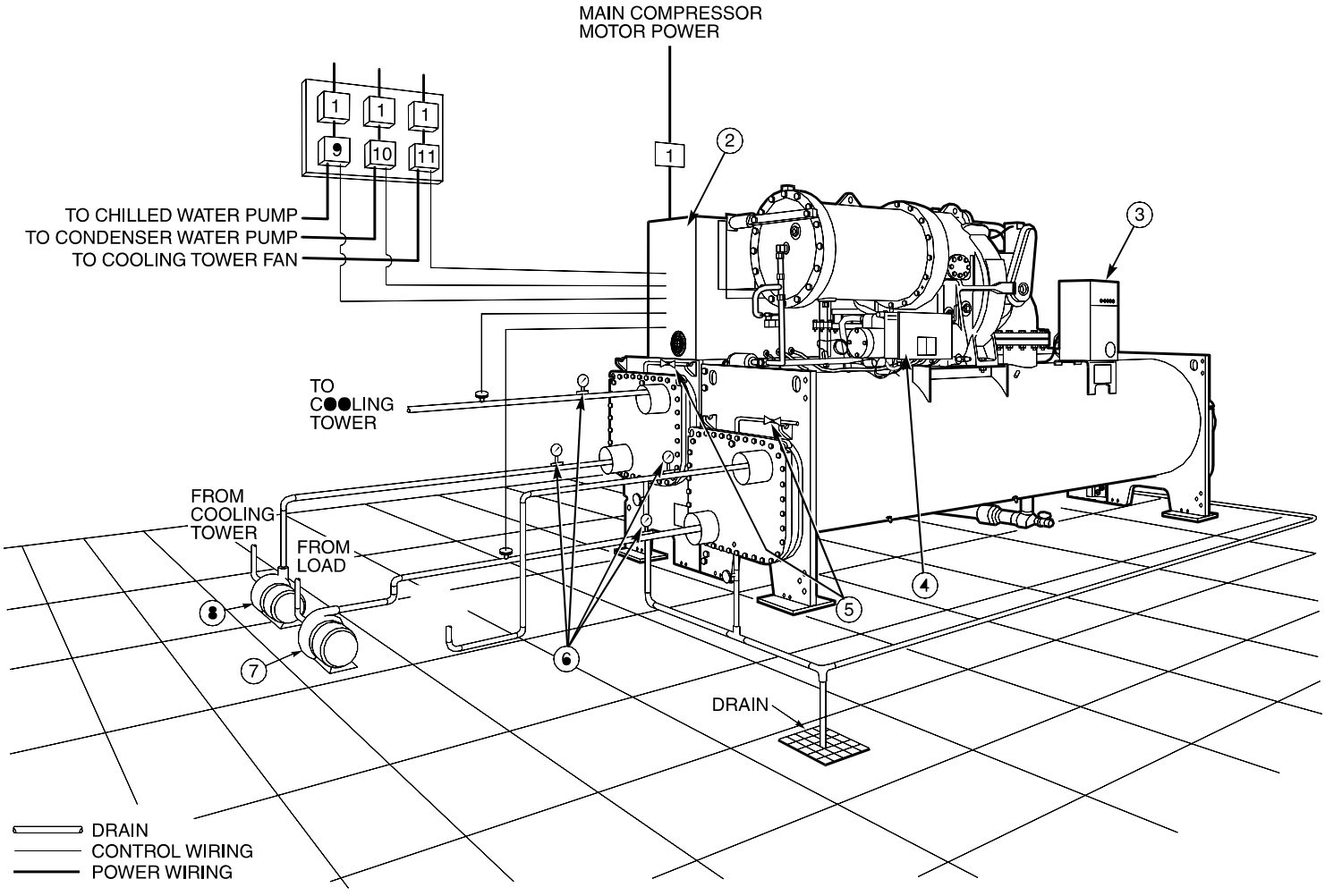


Figure 24 — 19XL With Optional Unit-Mounted Starter

Contents

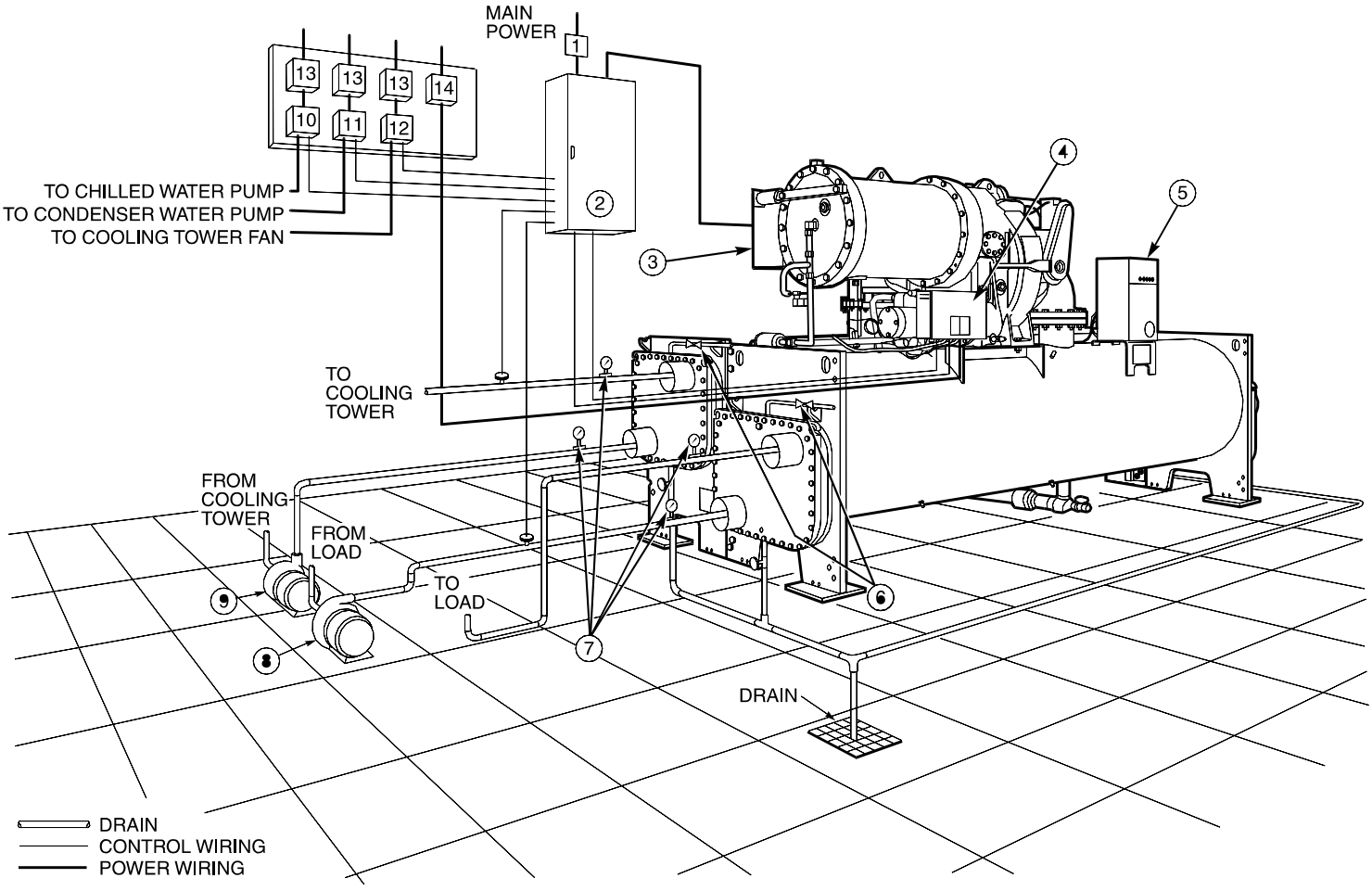


Figure 25 — 19XL With Freestanding Starter

Contents

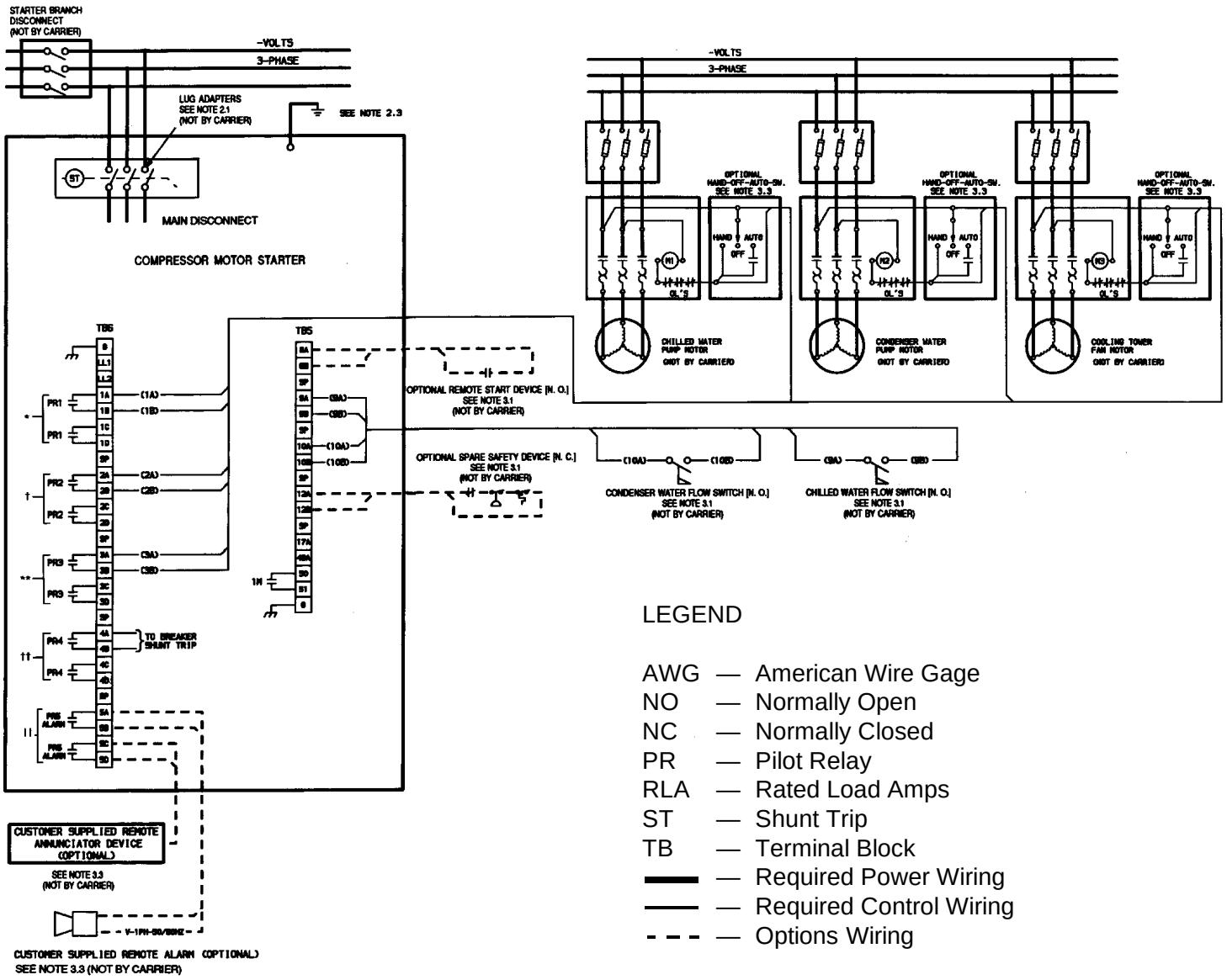

STARTER BRANCH DISCONNECT (NOT BY CARRIER)
-VOLTS
3-PHASE
LUG ADAPTERS SEE NOTE 2.1 (NOT BY CARRIER)
SEE NOTE 2.3
MAIN DISCONNECT
COMPRESSOR MOTOR STARTER
TB6
TB5
OPTIONAL REMOTE START DEVICE [N. O.] SEE NOTE 3.1 (NOT BY CARRIER)
OPTIONAL SPARE SAFETY DEVICE [N. C.] SEE NOTE 3.1 (NOT BY CARRIER)
CONDENSER WATER FLOW SWITCH [N. O.] SEE NOTE 3.1 (NOT BY CARRIER)
CHILLED WATER FLOW SWITCH [N. O.] SEE NOTE 3.1 (NOT BY CARRIER)
TO BREAKER SHUNT TRIP
CUSTOMER SUPPLIED REMOTE ANNUNCIATOR DEVICE (OPTIONAL)
SEE NOTE 3.3 (NOT BY CARRIER)
CUSTOMER SUPPLIED REMOTE ALARM (OPTIONAL) SEE NOTE 3.3 (NOT BY CARRIER)
OPTIONAL HAND-OFF-AUTO-SW. SEE NOTE 3.3
CHILLED WATER PUMP MOTOR (NOT BY CARRIER)
CONDENSER WATER PUMP MOTOR (NOT BY CARRIER)
COOLING TOWER FAN MOTOR (NOT BY CARRIER)
LEGEND
AWG — American Wire Gage
NO — Normally Open
NC — Normally Closed
PR — Pilot Relay
RLA — Rated Load Amps
ST — Shunt Trip
TB — Terminal Block
— Required Power Wiring
— Required Control Wiring
- - - — Options Wiring

Figure 26 — 19XL Typical Field Wiring with Optional Unit-Mounted Starter

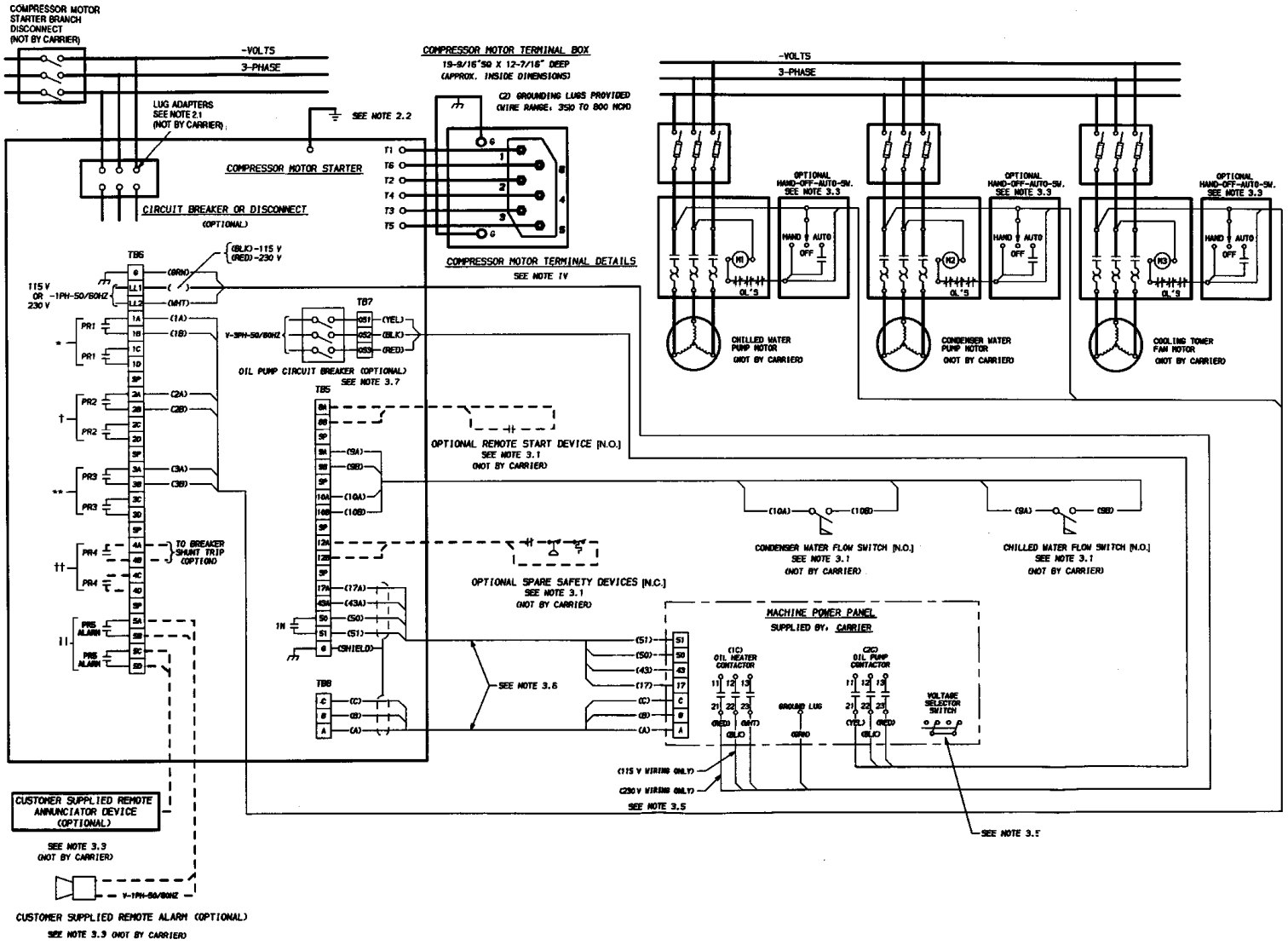

COMPRESSOR MOTOR STARTER BRANCH DISCONNECT (NOT BY CARRIER)
-VOLTS
3-PHASE
LUG ADAPTERS SEE NOTE 2.1 (NOT BY CARRIER)
SEE NOTE 2.2
COMPRESSOR MOTOR STARTER
CIRCUIT BREAKER OR DISCONNECT (OPTIONAL)
COMPRESSOR MOTOR TERMINAL BOX
19-9/16"SQ X 12-7/16" DEEP (APPROX. INSIDE DIMENSIONS)
(2) GROUNDING LUGS PROVIDED WIRE RANGE: 350 TO 800 MCM
COMPRESSOR MOTOR TERMINAL DETAILS
SEE NOTE 1V
T1
T6
T2
T4
T3
T5
OPTIONAL HAND-OFF-AUTO-SW. SEE NOTE 3.3
CHILLED WATER PUMP MOTOR (NOT BY CARRIER)
CONDENSER WATER PUMP MOTOR (NOT BY CARRIER)
COOLING TOWER FAN MOTOR (NOT BY CARRIER)
TB6
115 V OR 1PH-50/60HZ 230 V
(BLK)-115 V (RED)-230 V
TB7
OIL PUMP CIRCUIT BREAKER (OPTIONAL) SEE NOTE 3.7
TB5
OPTIONAL REMOTE START DEVICE (N.O.) SEE NOTE 3.1 (NOT BY CARRIER)
CONDENSER WATER FLOW SWITCH (N.O.) SEE NOTE 3.1 (NOT BY CARRIER)
CHILLED WATER FLOW SWITCH (N.O.) SEE NOTE 3.1 (NOT BY CARRIER)
OPTIONAL SPARE SAFETY DEVICES (N.C.) SEE NOTE 3.1 (NOT BY CARRIER)
TO BREAKER SHUNT TRIP (OPTION)
MACHINE POWER PANEL SUPPLIED BY: CARRIER
(1C) OIL HEATER CONTACTOR
(2C) OIL PUMP CONTACTOR
GROUND LUG
VOLTAGE SELECTOR SWITCH
SEE NOTE 3.6
(115 V WIRING ONLY)
(230 V WIRING ONLY)
SEE NOTE 3.5
SEE NOTE 3.5
CUSTOMER SUPPLIED REMOTE ANNUNCIATOR DEVICE (OPTIONAL)
SEE NOTE 3.9 (NOT BY CARRIER)
CUSTOMER SUPPLIED REMOTE ALARM (OPTIONAL)
SEE NOTE 3.9 (NOT BY CARRIER)
LEGEND
Required Power Wiring
Required Control Wiring
Options Wiring

Figure 27 — 19XL Typical Field Wiring with Free-Standing Starter

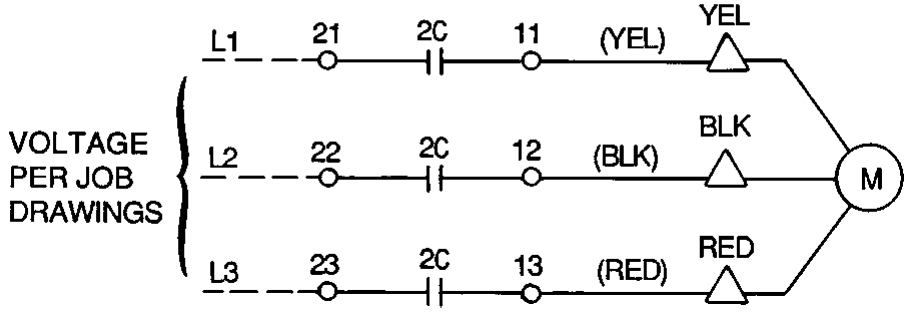


Figure 28 — Oil Pump Wiring

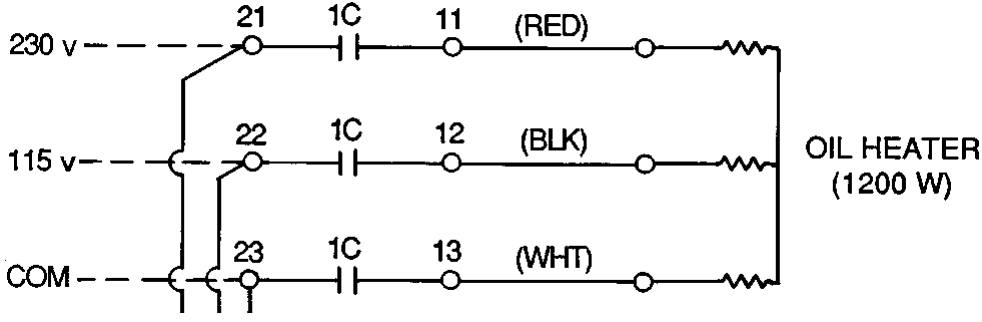


Figure 29 — Oil Heater and Control Power Wiring

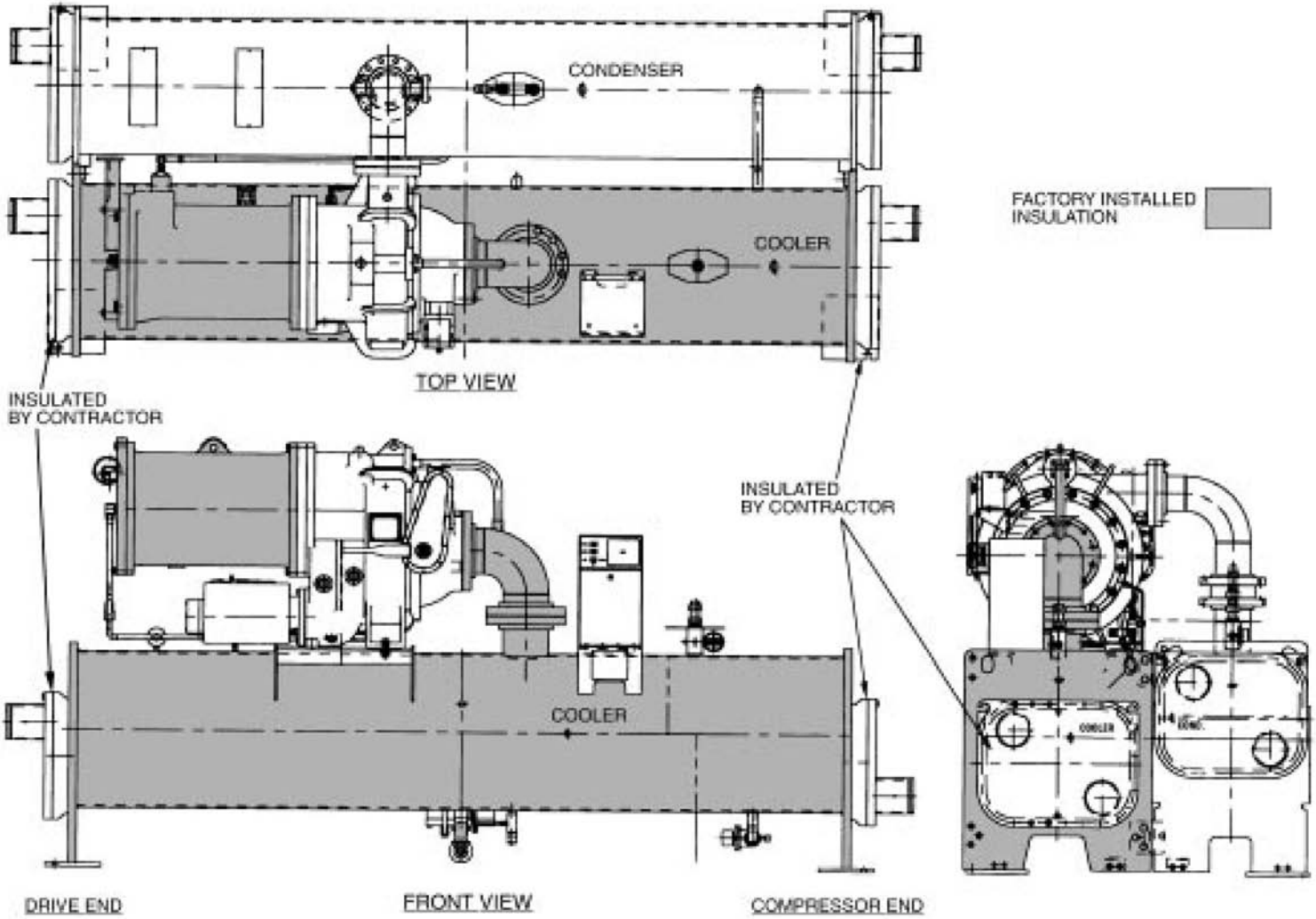


Figure 30 — 19XL Insulation Area

Contents

INSTALLATION START-UP REQUEST CHECKLIST

Machine Model Number: 19XL Serial Number: _____

To: _____ Date _____

_____

_____ _____
Project Name

Attn: _____ _____
Carrier Job Number

The following information provides the status of the chiller installation.

	YES/NO (N/A)	DATE TO BE COMPLETED
1. The machine is level.	_____	_____
2. The machine components are installed and connected in accordance with the installation instructions.	_____	_____
3. The isolation package and grouting (if necessary) are installed.	_____	_____
4. The relief valves are piped to the atmosphere.	_____	_____
5. All piping is installed and supported. Direction of flow is indicated in accordance with the installation instructions and job prints.		
a. Chilled water piping	_____	_____
b. Condenser water piping	_____	_____
c. Waterbox drain piping	_____	_____
d. Pumpout unit condenser piping (if installed)	_____	_____
e. Other _____	_____	_____
6. Gages are installed as called for on the job prints required to establish design flow for the cooler and condenser.		
a. Water pressure gages IN and OUT	_____	_____
b. Water temperature gages IN and OUT	_____	_____
7. The machine's starter wiring is complete. The wiring is installed per installation instructions and certified prints.		
a. Power wiring to compressor motor. (Motor leads will not be taped until the Carrier technician megger tests the motor.)	_____	_____
b. Oil pump wiring	_____	_____
c. Oil heater/control wiring	_____	_____
d. Other _____	_____	_____
8. The motor starter has not been supplied by Carrier. It has been installed according to the manufacturer's instructions.	_____	_____
9. The motor starter has not been supplied by Carrier and it has been checked for proper operation.	_____	_____

COMMENTS:

_____

_____

_____

_____

Contents

TESTING	YES/NO	DATE TO BE COMPLETED
1. The cooling tower fan has been checked for blade pitch and proper operation.	_____	_____
2. The chilled water and condenser water lines have been:		
a. Filled	_____	_____
b. Tested	_____	_____
c. Flushed	_____	_____
d. Vented	_____	_____
e. Strainers cleaned	_____	_____
3. The chilled water and condenser water pumps have been checked for proper rotation and flow.	_____	_____
4. The following cooling load will be available for start-up:		
a. 25%	_____	_____
b. 50%	_____	_____
c. 75%	_____	_____
d. 100%	_____	_____
5. The refrigerant charge is at the machine.	_____	_____
6. Services such as electrical power and control air will be available at start-up.	_____	_____
7. The electrical and mechanical representatives will be available to assist in commissioning the machine.	_____	_____
8. The customer's operators will be available to receive instructions for proper operation of the chiller after start-up.	_____	_____

Concerns about the installation/request for additional assistance:

_____

_____

_____

_____

_____

I am aware that the start-up time for a Carrier chiller can take between 2 and 6 days depending on the model of the machine and the options and accessories used with it.

Your contact at the job site will be _____

Phone number _____

Beeper number _____

Fax number _____

In accordance with our contract, we hereby request the services of your technician to render start-up services per contract terms for this job on _____ (Date). I understand that the technician's time will be charged as extra services due to correcting items in this checklist that are incomplete.

Signature of Purchaser _____

Signature of Job Site Supervisor _____

Contents